Testing Service	Appendix D for the BlackBore Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 1(95)
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

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA



Document

Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

Page **2(95)**

Author Data
Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013

Test Report No **RTS-6026-1302-18**

18

FCC ID:

L6ARFN80UW

2503A-RFN80UW

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





S Schweizerischer Kalibrierdienst
C Service sulsse d'étalonnage
S 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

Client

RTS (RIM Testing Services)

Cortificate No: ES3-3225_Jan12

Accreditation No.: SCS 108

CALIBRATION CERTIFICATE

Object ES3DV3 - SNi3225

Calibration procedure(s) QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4

Calibration procedure for dosimetric E-field probes

Calibration contribute 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 z 3)*C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	1CI	Car Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	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: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: 35086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (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	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-11)	In house check: Oct-12

Calibrated by:

Name

Function

Signature

Leboratory Technician

Approved by:

Ketja Pokovio

Tachnical Manager

Issued. Jenuary 12, 2012

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

Certificate No: ES3-3225_Jan12

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

Page

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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:

C

L6ARFN80UW

2503A-RFN80UW

Calibration Laboratory of

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





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

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL tissue simulating liquid 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 w orotation around probe axis

Polarization 8 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

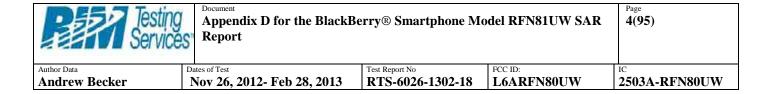
Calibration is Performed According to the Following Standards:

- IEEE Sid 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 9 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
 NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is
 implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included
 in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor modia.
- 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.

Confilente Mo: ES3 3005 Jan 10	Page 2 of 11	



ES3DV3 - SN:3225

January 11, 2012

Probe ES3DV3

SN:3225

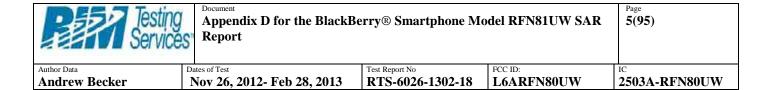
Manufactured: Calibrated: September 1, 2009 January 11, 2012

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: ES3-3225_Jan12

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ES3DV3-SN:3225 January 11, 2012

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

Basic Calibration Parameters

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

Modulation Calibration Parameters

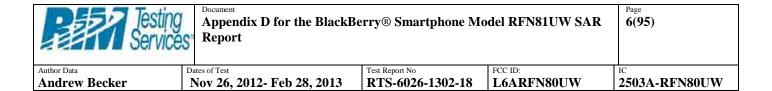
UID	Communication System Name	PAR		A dB	qB R	C dB	VR mV	Unc* (k=2)
10000	cw	0.00	X	0.00	0.00	1.00	107.7	±1.7 %
	1		Y	0.00	0.00	1.00	113.4	
			Z	0.00	0.00	1.00	110.4	

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

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

Numerical intearization 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.



ES3DV3-SN.3225 January 11, 2012

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

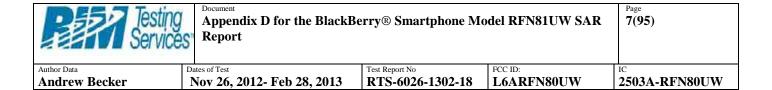
Calibration Parameter Determined in Head Tissue Simulating Media

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 Page 5 of 11

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

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



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 (S/m)	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

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

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



Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR

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Report

Author Data
Andrew Becker

Dates of Test
Nov 26, 2012- Feb 28, 2013

Test Report No **RTS-6026-1302-18**

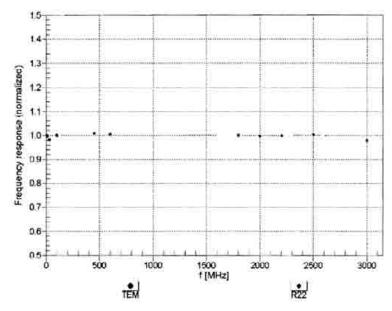
FCC ID: L6ARFN80UW

2503A-RFN80UW

ES3DV3-SN:3225

January 11, 2012

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



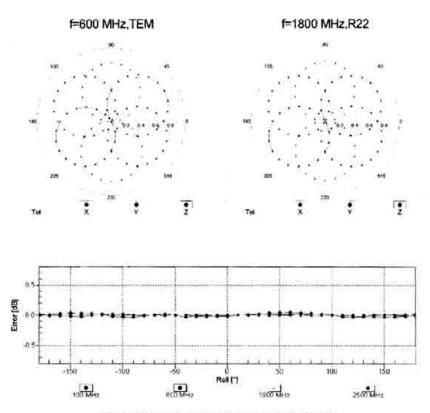
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Certificate	No:	ES3-3225	Jan12

Testing Services	Appendix D for the BlackBo Report	erry® Smartphone Mo	del RFN81UW SAR	Page 9(95)
	Dates of Test Nov 26, 2012- Feb 28, 2013	Test Report No RTS-6026-1302-18	FCC ID: L6ARFN80UW	2503A-RFN80UW

ES3DV3- SN:3225 January 11, 2012

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



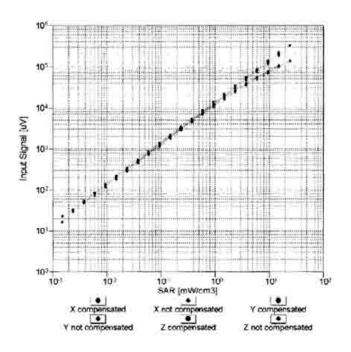
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

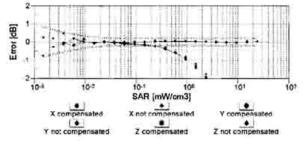
Certificate No: ES3-3225_Jan12 Page 8 of 11

Testing Services	Appendix D for the BlackBo Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 10(95)
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

ES3DV3-- SN:3225 January 11, 2012

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





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

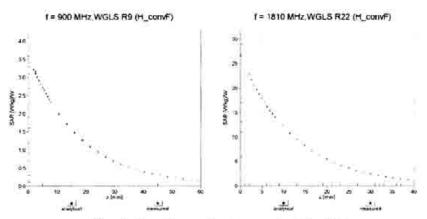
Certificate No: ES3-3225_Jan12

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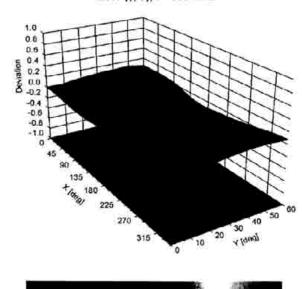
Testing Service	Appendix D for the BlackB Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 11(95)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW

ES3DV3- SN:3225 January 11, 2012

Conversion Factor Assessment



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



-1.0 -0.8 -0.8 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 1. Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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Testing Services	Appendix D for the BlackBo Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 12(95)
	Dates of Test Nov 26, 2012- Feb 28, 2013	Test Report No RTS-6026-1302-18	FCC ID: 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

We would be a second



Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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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





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

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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

S

C

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 (SI). The measurements and the uncertainties with confidence probability are given on the rotiowing pages and are part of the certificate.

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E44198	GB41293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41408087	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 Attenuator	SN: 85086 (20b)	27 Mar 12 (No. 217-01520)	Apr 13
Reference 30 dB Attenuator	SN: 85129 (300)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	28-Dec-12 (No. E53-3013_Dec12)	Dec-13
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	10	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Aur-11)	In house check: Apr-13
Network Analyzer HP 8753E	UE37330585	18 Out 01 iin house check Oct 12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by	Jaton Kastrali	Laboratory Technician	fu
Approved by:	Katja Pokovic	Technical Manager	Jak My
			Issued: January 14, 2013
Ins calibration certificate	shall not be reproduced except in tu	without written approval of the laborator	у.

Certificate No: ES3-3225_Jan13

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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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 Zunch, Switzerland





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Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL NORMx,y,z ConvF

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

DGP

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

A, B, C, D Polarization φ

φ rotation around probe axis

Polarization 9

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

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

Calibration is Performed According to the Following Standards:

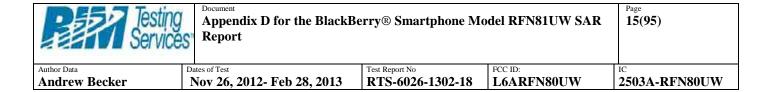
- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques," December 2003
- Techniques*, December 2003
 b) IEC 62209-1. "Procedure to measure the Specific Absorption 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: Accessed 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: ES3-3225_Jan13

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ES3DV3 - \$N:3225

January 10, 2013

Probe ES3DV3

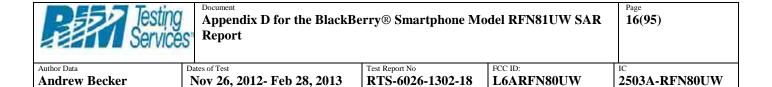
SN:3225

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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ES3UV3- 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 $(\mu V/(V/m)^2)^n$	1.29	1.19	1.31	± 10.1 %
DCP (mV) ^{ff}	100.5	101.5	99.9	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dBõV	С	qB D	VR mV	Unc* (k=2)
0	CW	X	0.0	0.0	1.0	0.00	157.5	±2.7 %
		Y	0.0	0.0	1.0		158.4	
		Z	0.0	0.0	1.0		165.9	

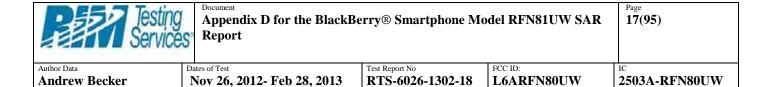
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No. ES3-3225_Jan13

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

Numerical linearization parameter, unconstitut 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.



ES3DV3-SN:3225

January 10, 2013

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

Calibration Parameter Determined in Head Tissue Simulating Media

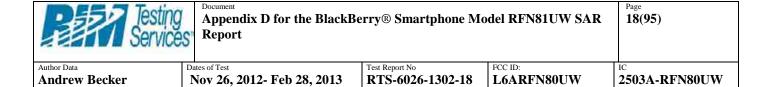
f (MHz) ^C	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.56	6.56	6.56	0.42	1.54	± 12.0 %
900	41.5	0.97	6.19	6.19	6.19	0.43	1.52	± 12.0 %
1810	40.0	1.40	5.35	5.35	5.35	0.63	1,39	± 12.0 %
1950	40.0	1.40	5.09	5.09	5.09	0.80	1.23	± 12.0 %
2450	39.2	1.80	4.65	4.65	4.65	0.61	1.63	±12.0 %
2600	39.0	1.96	4.43	4.43	4.43	0.80	1.32	± 12.0 %

Certificate No. ES3-3225 Jan 13

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⁶ Frequency validity of ± 100 MHz only applies for DASY w4.4 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 frequencies below 3 GHz, the validity of flexus parameters (a and s) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAV values. Alt frequencies above 3 GHz, the validity of fissue parameters (c and a) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.



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	Conductivity (S/m)	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	± 72.0 %
900	55.0	1,05	6.12	6.12	6.12	0.73	1.25	± 12.0 %
1810	53.3	1.52	5.04	5.04	5.04	0.57	1,47	± 12.0 %
1950	53.3	1,52	4,94	4.94	4.94	0.58	1.50	± 12.0 %
2450	52.7	1.95	4 35	4.35	4.35	0.70	1.16	± 12.0 %
2600	52.5	2.16	4.11	4.11	4.11	0.67	0.99	± 12.0 %

Certificate No: ES3-3225 Jan 13

⁶ Fraquency validity of ± 100 MHz only applies for DASY +t, 4 and higher (see Page 2), size it is instricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncortainty for the indicated frequency bend.
⁷ At frequencies below 3 GHz, the validity of tiesue parameters (c and a) can be released to ± 10% if liquid compensation formula is applied to measured SAM values. At frequencies above 3 GHz, the validity of tiesue parameters (c and a) is restricted to ± 5%. The uncortainty is the RSS of the ConvF uncertainty for indicated target issue parameters.

	Testing Service	Appendix D for the BlackB Report	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report				
A	author Data	Dates of Test	Test Report No	FCC ID:			
	Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW			

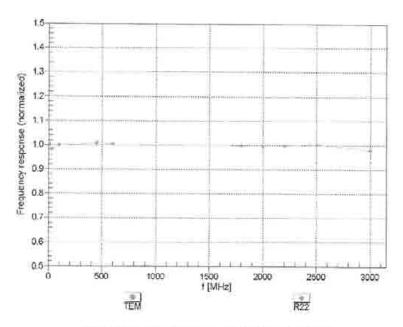
19(95)

2503A-RFN80UW RTS-6026-1302-18 L6ARFN80UW

E33DV3- \$N.3225

January 10, 2013

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



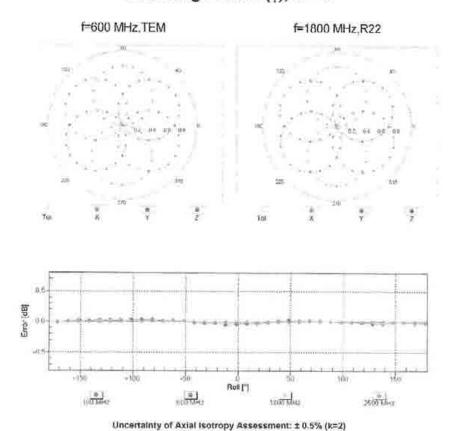
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Testing Service	Appendix D for the BlackB Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 20(95)
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

ES3DV3-3N:3225

January 10, 2013

Receiving Pattern (6), 9 = 0°



of the standy of Axial Isotropy Assessment. 1 0.5% (K-2)

Certificate No. E83-3225 Jan 13

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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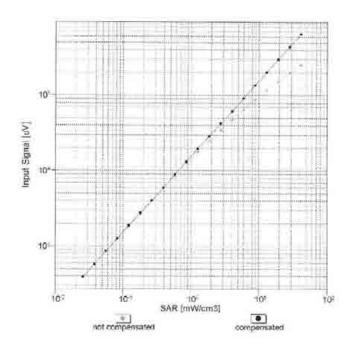
Author Data **Andrew Becker** Dates of Test Nov 26, 2012- Feb 28, 2013 Test Report No RTS-6026-1302-18 FCC ID: L6ARFN80UW

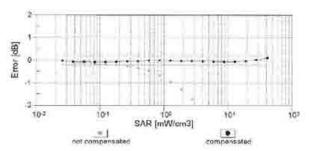
2503A-RFN80UW

ES3DV3-3N.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

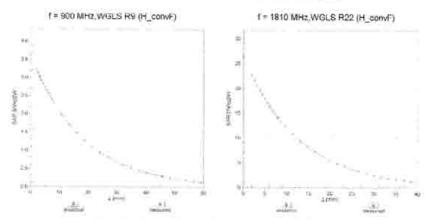
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Testing Service	Appendix D for the BlackB Report	Berry® Smartphone M	odel RFN81UW SAR	Page 22(95)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW

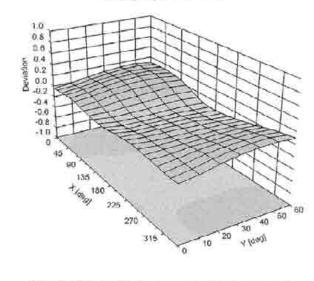
E33DV3- \$N:3225

January 10, 2013

Conversion Factor Assessment



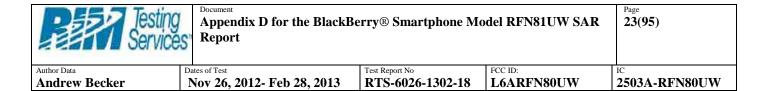
Deviation from Isotropy in Liquid Error (φ, θ), f = 900 MHz



-1.0 -0.0 -0.0 -0.4 -0.2 0.0 0.2 0.4 0.0 0.8 1.1 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: ES3-3225_Jan 13

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E33DV3-3N 3225

January 10, 2013

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

Other Probe Parameters

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

Certificate No: ES3-3225_Jan13

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

24(95)

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





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

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

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

Certificate No. EX3-3592_Nov12

CALIBRATION CERTIFICATE

Object

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 (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the perificato.

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

Calibration Equipment used (M&TE entical for calibration)

Primary Standards	(0	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-D1508)	April 13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mer-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01632)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013, Dec11)	Dec-12
DAE4	SN: 860	20-Jun-12 (No. DAE4-660_Jun12)	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

	Name	Function	\$ignature \
Calibrated by	Claudio Leubler	Leboratory Technician	10/
Approved by	Katjo Pokovic	Technical Manager	ZA.
	Share was the same of the same		Issued November 14, 2012

Certificate No: EX3-3592_Nov12

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Document

Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

Page

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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





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S Schweizerischer Kalibrierdienst

C Service suisse d'étalonnage Servizio svizzoro di taratura

Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL 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 φ φ rotation around probe axis

Polarization 9

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

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

Calibration is Performed According to the Following Standards:

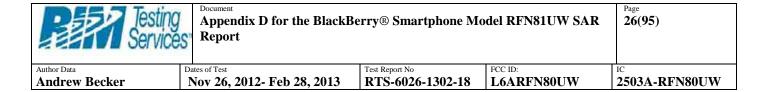
- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spalial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- iEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held 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 9 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
 NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is
 implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included
 in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z; Bx,y,z; Cx,y,z, 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

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EX3DV4 - SN:3592

November 14, 2012

Probe EX3DV4

SN:3592

Manufactured: Calibrated:

September 18, 2006 November 14, 2012

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

Certificate No: EX3-3592_Nov12

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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) ⁿ	0.49	0.47	0.41	± 10.1 %
Norm (µV/(V/m) ²) ⁿ DCP (mV) ²	95.2	96.1	100.6	

Modulation Calibration Parameters

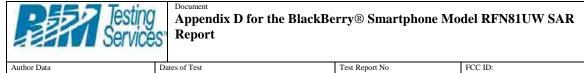
מוט	Communication System Name	PAR		A dB	8 dB	C dB	WR mV	Unc ^E (k=2)
0	O CW 0.0	0.00	X	0.0	0.0	1.0	121.4	±3.0 %
			Y	0.0	0.0	1.0	104.3	
			Z	0,0	0.0	1.0	109.2	

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

Certificate No: EX3-3592_Nov12

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

Numerical linearization parameter: In concentrate the square of the Uncertainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the field value



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Andrew Becker

Nov 26, 2012- Feb 28, 2013

RTS-6026-1302-18

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

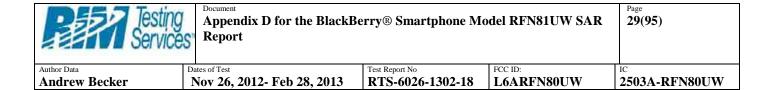
f (MHz) ^C	Relative Permittivity	Conductivity (Sim)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct, (k≠2)
2600	39.0	1.96	6.45	6.45	6.45	0.53	0.79	± 12.0 %
5200	36.0	4.66	4.73	4.73	4.73	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.28	4.28	4.28	0.44	1.80	± 13.1 %
5800	35.3	5.27	4.12	4.12	4.12	0.48	1.80	± 13.1 %

Certificate No. EX3-3592_Nov12

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Frequency validity of \pm 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to \pm 60 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

At frequencies below 3 GHz, the validity of fiscue parameters (ϵ and ϵ) can be relaxed to \pm 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and ϵ) is restricted to \pm 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.



EX3DV4-SN:3592

November 14, 2012

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

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^E	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF 2	Alpha	Depth (mm)	Unct_ (k=2)
2600	52.5	2.18	6.59	6.59	6.59	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.02	4.02	4.02	0.48	1,90	± 13.1 %
5500	48.6	5.65	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 %

Certificate No. EX3-3592 Nov12 Page 6 of 11

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

At frequencies below 3 GHz, the validity of tissue parameters (c and c) can be relaxed to ± 10% if squird compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (c and e) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target fissue parameters.



Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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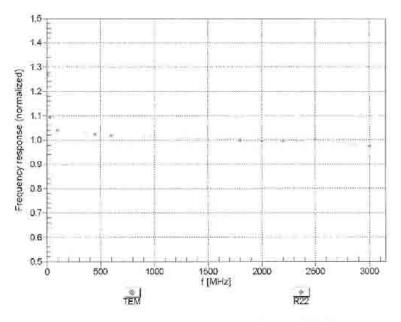
Author Data **Andrew Becker** Dates of Test Nov 26, 2012- Feb 28, 2013 Test Report No RTS-6026-1302-18 FCC ID: L6ARFN80UW

2503A-RFN80UW

EX3DV4- \$N: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

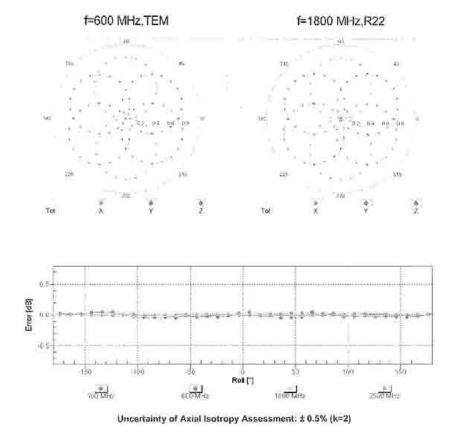
Page 7 of 11

Testing Services	Appendix D for the BlackBo Report	erry® Smartphone Mo	del RFN81UW SAR	Page 31(95)
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

EX3DV4-SN:3592

November 14, 2012

Receiving Pattern (\$\phi\$), 9 = 0°



Certificate No. EX3-3592_Nov12

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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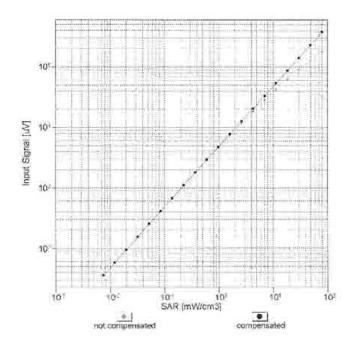
Author Data **Andrew Becker** Dates of Test Nov 26, 2012- Feb 28, 2013 Test Report No RTS-6026-1302-18 FCC ID: L6ARFN80UW

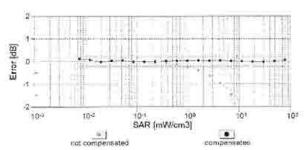
2503A-RFN80UW

EX3DV4- SN:3592

November 14, 2012

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





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

Certificate No: EX3-3592_Nov12

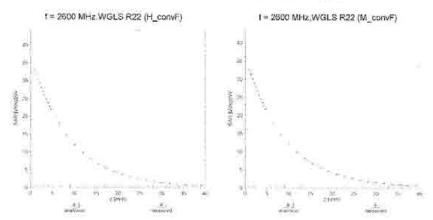
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Testing Service	Appendix D for the BlackB Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 33(95)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW

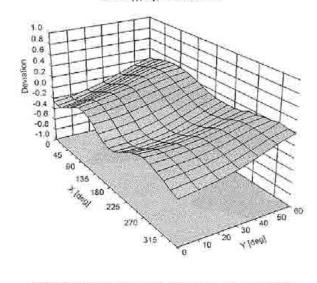
EX3DV4-SN:3592

November 14, 2012

Conversion Factor Assessment



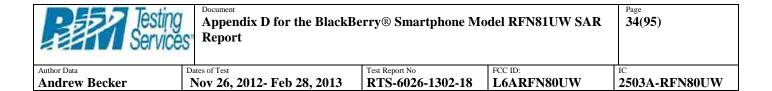
Deviation from Isotropy in Liquid Error (φ, 9), f = 900 MHz



-1.0 -0.8 -0.8 -0.4 -0.2 0.0 0.2 0.4 0.5 0.8 1.5 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No. EX3-3592_Nov12

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EX3DV4-SN:3592

November 14, 2012

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

Other Probe Parameters

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

Certificate No: EX3-3592_Nov12

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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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





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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: ET3-1644_Nov12

CALIBRATION CERTIFICATE ET3DV6 - \$N:1644 Object QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4 Calitration procedure(s) Calibration procedure for dosimetric E-field probes Calibration date: November 13, 2012 This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate All calibrations have been conducted in the closed laboratory facility; environment temperature (22 ± 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID:	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41496087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: 95054 (3c)	27-Mar-12 (No. 217-01531)	Apri 13
Reference 20 dB Attenuator	SN: S5066 (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	Z9-Dec-11 (No. ES3-3013, Dec11)	Dec-12
DAE4	SN: 680	20-Jun-12 (No. DAE4-660, Jun12)	Jut-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

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	+u
Approved by:	Katja Pokovic	Technical Manager	J. B. K.
	shall not be reproduced except in full		Issued: November 13, 2012

Certificate No. ET3-1644_Nov12

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

36(95)

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





Schweizerischer Kalibrierdienst S Service sulsse d'étalonnage C

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:

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

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

Polarization of φ rotation around probe axis

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

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

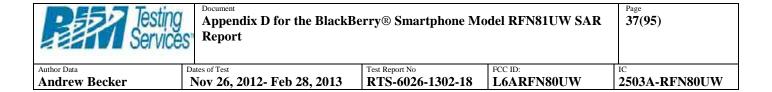
Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization θ = 0 (f \leq 900 MHz in TEM-cell; f \geq 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 Charl). 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,v,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
- 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 t > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Certificate No: ET3-1644_Nov12	Page 2 of 11	
CHARLES INC. E 15-10-4-1404 12	Cogo a or a r	



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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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

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) ^A	1.71	1.97	1.98	± 10.1 %
DCP (mV)"	99.5	98.7	97.5	

Modulation Calibration Parameters

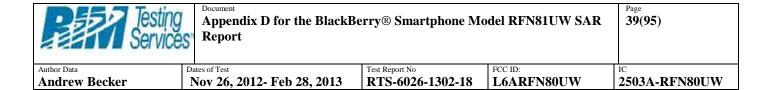
UID	Communication System Name	PAR		A dB	B	C dB	wV.	Unc (k=2)
0	CW	0.00	X	0.0	0.0	1.0	193.5	±3.5 %
			Y	0.0	0.0	1.0	212.0	
			2	0.0	0.0	1.0	201.7	

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

The uncertainties of NormX.Y.Z do not affect the E⁻-hield uncertainty inside TSL (see Pages 5 and 6).

"Numerical linearization parameter: uncertainty not required.

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



ET3DV6-SN:1644

November 13, 2012

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

Calibration Parameter Determined in Head Tissue Simulating Media

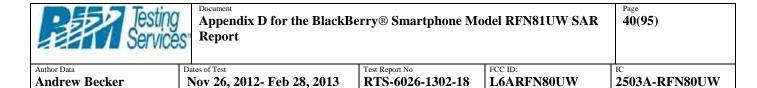
f (MHz) ^C	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.57	6.57	6.67	0.44	2.25	± 12.0 %
900	41,5	0.97	6.24	6.24	6.24	0.38	2.52	± 12.0 %
1810	40.0	1.40	5.21	5.21	5.21	0.80	2.10	± 12.0 %
1950	40.0	1.40	5.16	5.16	5-16	0.80	2.09	± 12.0 %
2450	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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Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency bund.

At frequencies below 3 GHz, the validity of Issue parameters (i. and in) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of Issue parameters (i. and in) is restricted to ± 5%. The unportainty is the RSS of the ConvF undertainty for indicated target lissue parameters.



ET3DV6- SN.1644

November 13, 2012

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

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [©]	Relative Permittivity [®]	Conductivity (S/m)	ConvF X	CanvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.30	6.30	6.30	0.33	2.61	± 12.0 %
900	55.0	1.05	6.06	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 %

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

At frequencies below 3 CHz, the validity of Inssue parameters (c and e) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values A frequencies above 3 CHz, the validity of tissue parameters (c and e) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated larget tissue parameters.

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Testing Service	Appendix D for the BlackB Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 41(95)
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

ET3DV6-SN:1644

November 13, 2012

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

1.5
1.4
1.3
1.2
1.1
98 1.0
0.9
0.8
0.7
0.8
0.5
0 500 1000 1500 2000 2800 3000

[MH2]

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

Certificate No: ET3-1644_Nov12

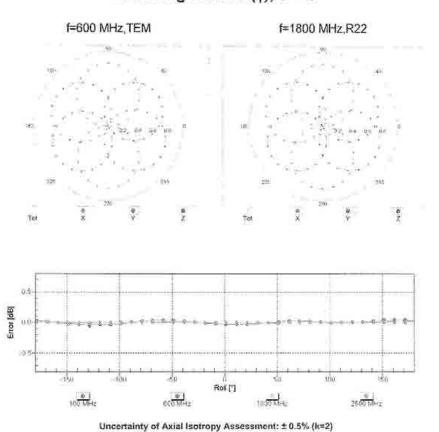
Page 7 of 11

Testing Services	Appendix D for the BlackBo Report	erry® Smartphone Mo	del RFN81UW SAR	Page 42(95)
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

ET3DV6-SN:1644

November 13, 2012

Receiving Pattern (\$\phi\$), 9 = 0°



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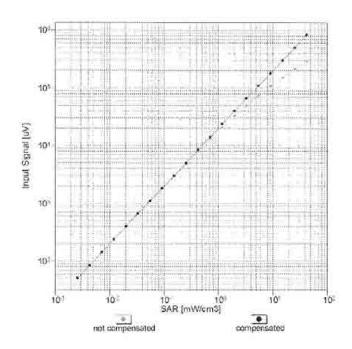
Author Data **Andrew Becker** Dates of Test Nov 26, 2012- Feb 28, 2013 Test Report No RTS-6026-1302-18 FCC ID: L6ARFN80UW

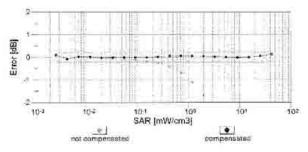
2503A-RFN80UW

ET3DV6- SN:1644

November 13, 2012

Dynamic Range f(SARhead) (TEM cell , f = 900 MHz)





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

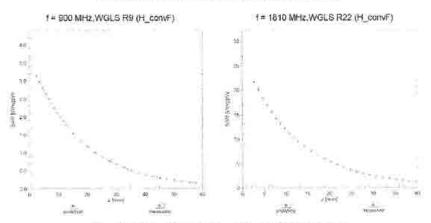
Certificate No: ET3-1644_Nov12

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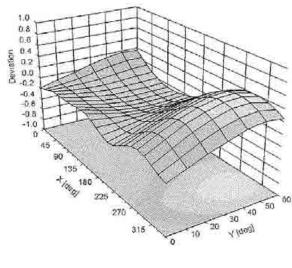
Testing Service	Appendix D for the BlackB Report	Berry® Smartphone M	odel RFN81UW SAR	Page 44(95)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW

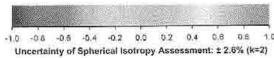
ET3DV6- SN:1644 November 13, 2012

Conversion Factor Assessment



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





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Testing Service	Appendix D for the BlackB Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 45 (95)
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

ET3DV6-- SN:1844

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	70 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2,7 mm
Probe Tip to Sensor Z Calibration Point	2.7 inm
Recommended Measurement Distance from Surface	4 mm
The state of the s	

Certificate No. ET3-1644_Nov12

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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





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

Swiss Calibration Service

Accredited by the Swiss Accreditation Senace (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

Certificate No: D835V2-446_Jan11 **RTS (RIM Testing Services)**

Object	D835V2 - SN: 44	6	
Calibration procedure(s)	QA CAL-05.v8	V STORY V STREET W. VIII	
	Calibration proce	dure for dipole validation kits	
	11-1	100	
Calibration date:	January 21, 2011		
alibration date:	January 21, 2011		
	그렇게 하지 않는데 그런데 그래요? 그런데 얼마나 없다.	onal standards, which realize the physical u	등장점에 있는 No. 10 등 전기를 되었다. 이 10 등 등에 가입니다.
he measurements and the unce	itainties with confidence p	robability are given on the following pages a	nd are part of the certificate.
All calibrations have been conduc	cted in the closed laborator	y facility: environment temperature (22 x 3)	°C and humidity < 70%.
Samuel of the beautiful of the same	PE Address for College States		
Calibration Equipment used (M&	E 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
	US37202783	A CONTRACTOR OF THE CONTRACTOR	A 17.44
lower sensor HP 8481A	0837202783	06-Oct 10 (No. 217-01266)	Oct-11
	SN: 5086 (20g)	30-Mar-10 (No. 217-01268)	Mar-11
Power sensor HP 8481A Reference 20 dB Attenuator Type N mismatch combination			
Reference 20 dB Attenuator Type N mismatch combination	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Reference 20 dB Attenuator	SN: 5086 (20g) SN: 5047.2 / 06327	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162)	Mar-11 Mar-11
Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3	SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr-10)	Mar-11 Mar-11 Apr-11
Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 DAE4	SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10)	Mar-11 Mar-11 Apr-11 Jun-17
Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A	SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house)	Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check
Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards	SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601 ID # MY41092317	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09)	Mar-11 Mar-11 Apr-11 Jun-17 Scheduled Check In house check: Oct-11
Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8461A RF generator R&S SMT-06	SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-09)	Mar-11 Mar-11 Apr-11 Jun-17 Scheduled Check In house check: Oct-11 In house check: Oct-11
Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8461A RF generator R&S SMT-06 Network Analyzer HP 8753E	SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function	Mar-11 Mar-11 Apr-11 Jun-17 Scheduled Check In house check: Oct-11 In house check: Oct-11
Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8461A RF generator R&S SMT-06	SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-09)	Mar-11 Mar-11 Apr-11 Jun-17 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11
Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8461A RF generator R&S SMT-06 Network Analyzer HP 8753E Calibrated by:	SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function	Mar-11 Mar-11 Apr-11 Jun-17 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11
Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8461A RF generator R&S SMT-06 Network Analyzer HP 8753E	SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name Dirnce liley	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function Laboratory Technician	Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11
Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8461A RF generator R&S SMT-06 Network Analyzer HP 8753E Calibrated by:	SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name Dirnce liley	30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function Laboratory Technician	Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11

Certificate No: D835V2-446_Jan11

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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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, 9004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst

Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL

tissue simulating liquid

ConvF N/A sensitivity in TSL / NORM x,y,z

not applicable or not measured

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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Author Data **Andrew Becker** Dates of Test Nov 26, 2012- Feb 28, 2013 Test Report No RTS-6026-1302-18 FCC ID: L6ARFN80UW

2503A-RFN80UW

Measurement Conditions

DASY5	V52.6
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	41.3 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(21.8 ± 0.2) °C	in the second	****

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 cm3 (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)

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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Author Data
Andrew Becker

Dates of Test

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Test Report No **RTS-6026-1302-18**

FCC ID: L6ARFN80UW

2503A-RFN80UW

Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 24, 2001

Certificate No: D835V2-446_Jan11

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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

DASY5 Validation Report for Head TSL

Date/Time: 21.01.2011 10:18:05

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL900

Medium parameters used: f = 835 MHz; $\sigma = 0.89$ mho/m; $\varepsilon_t = 41.2$; $\rho = 1000$ 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; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

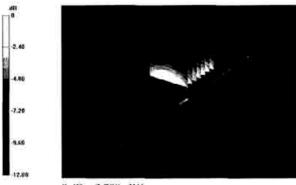
Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement

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/gMaximum value of SAR (measured) = 2,790 mW/g



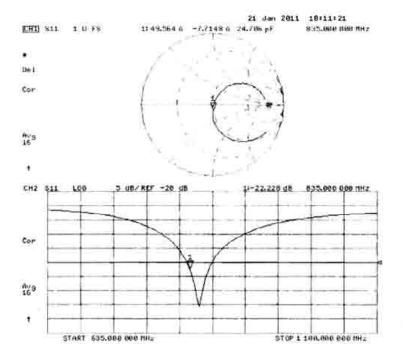
0 dB = 2.790 mW/g

Certificate No: D835V2-446_Jan11

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Impedance Measurement Plot for Head TSL



Certificate No: D835V2-446_Jan11 Page 6 of 6



52(95)

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





Schweizertscher 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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No. D835V2-446_Jan13

Object	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		
This calibration cartilicate docum	ents the traceability to nati	onal standards, which regize the physical un	ils of measurements (SI).
	The state of the contract of the state of th	robability are given on the following pages an	
The measurements and the unce	maintes with confidence p		
		ry facility: environment temperature (22 ± 3)°(C and humidity < 70%.
All calibrations have been condu	cted in the closed laborator		C and flumidity < 70%
all calibrations have been conductable all calibration Equipment used (M&	cted in the closed laborator	ny facility: environment temperature (22 ± 3)° (C and flumidity < 70%. Schaduled Calibration
all calibrations have been conducted the calibration Equipment used (M&Primary Standards	cted in the closed laborator TE critical for calibration)		to seem that are a way of a seem
all calibrations have been conductal calibration Equipment used (M& rimary Standards cover meter EPM-442A	cted in the closed laborator TE critical for calibration)	ny facility: environment temperature (22 ± 3)°4 Cal Date (Certificate No.)	Scheduled Calibration
all calibrations have been conductal calibration Equipment used (M& rimary Standards cover meter EPM-442A cover censor HP 8481A	TE critical for calibration) ID 4 GB37480704	ry facility: environment temperature (22 ± 3)° t Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640)	Scheduled Calibration Oct+13
all calibrations have been conductable and (M& calibration Equipment used (M& calibration Equ	TE critical for calibration) ID 4 GB37480704 US37292783	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Scheduled Calibration Oct+13 Oct-13
All calibrations have been conducted (M& Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dt Attenuator Type-N mismatch combination	TE critical for calibration) ID 4 GB37480704 US37292783 SN: 5955 (20k)	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 07-Mu-12 (No. 217-01530)	Scheduled Calibration Oct+13 Oct+13 Apr+13
All calibrations have been conducted in the calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dt Attenuator type-N mismatch combination Reference Probe ES3DV3	cted in the closed laborator TE critical for calibration) ID # GB37480704 US37292783 SN: 5056 (20k) SN: 5047.3 / 06327	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nev-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13
All calibrations have been conductable calibration Equipment used (M&Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4	ted in the closed laborator TE critical for calibration) ID 4 GB37480704 US37292783 SN: 5055 (20k) SN: 5047.3 / 06327 SN: 3205	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mu-12 (No. 217-01530) 27-Mu-12 (No. 217-01533) 28-Dec-12 (No. E39-3205_Dec12)	Scheduled Calibration Oct+13 Oct-13 Apr-13 Apr-13 Dec-13
	TE critical for calibration) ID 4 GB37480704 US37292783 SN: 5055 (20k) SN: 5047.3 / 06327 SN: 601	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mu-12 (No. 217-01530) 27-Mu-12 (No. 217-01533) 28-Dec-12 (No. E39-3205_Dec12) 27-Lin-12 (No. DAE4-601_Jun12)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Lin-13
All calibrations have been conducted (M& Calibration Equipment used (M& Calibration Equipment used (M& Calibration Equipment used (M& Calibration Equipment Epige N mismatch combination Reference Probe ES3DV3 DA64 Secondary Standards Power sensor HP 0401A	ted in the closed laborator TE critical for calibration) ID # GB37480704 US37292783 SN: 5056 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mai-12 (No. 217-01530) 27-Mai-12 (No. 217-01533) 28-Dec-12 (No. 237-01533) 28-Dec-12 (No. E39-3200_Dec12) 27-Lun-12 (No. DAE4-601_,kun12) Check Date in nouse) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in nouse check Oct-11)	Scheduled Calibration Oct+13 Oct+13 Apr+13 Apr+13 Dec-13 Inr+13 Scheduled Check In house check: Oct+13 In house check: Oct+13
All calibrations have been conducted (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DA64 Secondary Standards Power sensor HP 8401A RH-generator R&S SMT-US	TE critical for calibration) ID 4 GB37480704 US37292783 SN: 5055 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mui-12 (No. 217-01530) 27-Mui-12 (No. 217-01533) 28-Dec-12 (No. 239-3200_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date in nouse)	Scheduled Calibration Oct+13 Oct+13 Apr-13 Apr-13 Dec-13 Inn-13 Scheduled Check In house check: Oct 13
All calibrations have been conducted (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DA64 Secondary Standards Power sensor HP 8401A RH-generator R&S SMT-US	Cited in the closed laborator TE critical for calibration) ID 4 GB37480704 US37292783 SN: 5059 (20k) SN: 5047.3 / 06327 3N: 3205 SN: 801 ID # MY41092317 100005 US37390585 S4206	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mai-12 (No. 217-01530) 27-Mai-12 (No. 217-01530) 27-Mai-12 (No. E39-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date in nouse) 18-Oct-02 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Inn-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Calibrations have been conducted in Calibration Equipment used (M&Calibration Equipment used (M&Calibration Equipment used (M&Calibration Equipment USE) Primary Standards Power sensor HP 8481A Reference Probe ES3DV3 DA64 Secondary Standards Power sensor HP 9401A H- generator H&S SMT-ub Network Analyzor HP 8763E	Cited in the closed laboration TE critical for calibration) ID 4 GB37480704 US37292783 SN: 5055 (20k) SN: 5057 3 706327 SN: 3205 SN: 601 ID:# MY41092317 100005 US37390585 S4206 Name	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. E39-3200_Dec12) 27-Jun-12 (No. DAE4-601_Rin12) Check Date in nouse) 16-Oct-02 (in house check Oct-11) 08-Aug-99 (in house check Oct-12) Function	Scheduled Calibration Oct+13 Oct+13 Apr+13 Apr+13 Dec-13 Inr+13 Scheduled Check In house check: Oct+13 In house check: Oct+13
All calibrations have been conducted (M& Calibration Equipment used (M& Calibration Equipment used (M& Calibration Equipment used (M& Calibration Equipment Epithematics (M& Albertation Equipment Calibration Equipment Equipment (M& Calibration Equipment Equipment Equipment Equipment Equipment (M& Equipment	Cited in the closed laborator TE critical for calibration) ID 4 GB37480704 US37292783 SN: 5059 (20k) SN: 5047.3 / 06327 3N: 3205 SN: 801 ID # MY41092317 100005 US37390585 S4206	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mai-12 (No. 217-01530) 27-Mai-12 (No. 217-01530) 27-Mai-12 (No. E39-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date in nouse) 18-Oct-02 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Inn-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13

Certificate No: D836V2-446_Jan13

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

Page **53(95)**

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





S Schweizerischer Kalibrierdienst
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Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL

tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

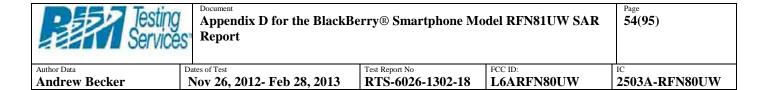
Methods Applied and Interpretation of Parameters:

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

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

Certificate No: D835V2-446_Jan13

Page 2 of 6



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 mbo/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		1,200

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 1W	9.39 W/kg ± 17.0 % (k=2)

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

Certificate No. D835V2-446_Jan13



Dates of Test

Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

Page **55(95)**

Test Report No FCC ID:

2503A-RFN80UW

Appendix

Author Data

Andrew Becker

Antenna Parameters with Head TSL

Nov 26, 2012- Feb 28, 2013

Impedance, transformed to feed point	50,1 Ω - 6.5 Ω	
Return Loss	- 23.7 dB	

General Antenna Parameters and Design

Electrical Delay (one direction) 1.385 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	October 24, 2001	

Certificate No: D835V2-446_Jan13

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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

DASY5 Validation Report for Head TSL

Date: 07.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 835 MHz

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

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)

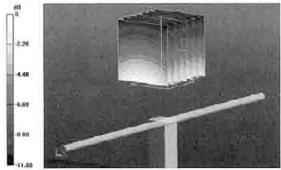
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

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

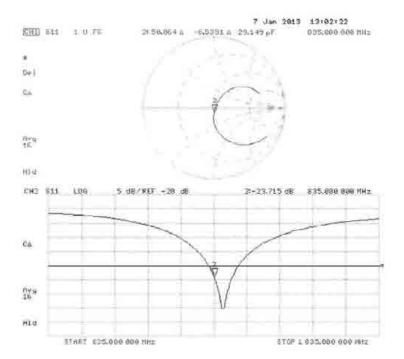
Maximum value of SAR (measured) = 2.79 W/kg



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

Testing Service	Appendix D for the BlackB Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 57(95)
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

Impedance Measurement Plot for Head TSL





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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





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

Issued April 7, 2011

Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signetories to the EA Mutritateral Agreement for the recognition of celibration certificates

RTS (RIM Testing Services) Client

Accreditation No.: SCS 108

Certificate No: D835V2-4d043_Apr11

CALIBRATION CERTIFICATE D835V2 - SN: 4d043 Object Catibration procedure(s) **QA CAL-05.V8** Calibration procedure for dipole validation kits Calibration date: April 07, 2011 This colibration certificate documents the traceability to national standards, which realize the physical prits of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the cartilicate. All calibrations have been conducted in the closed laboratory lacking, severonment temperature (22 ± 3)°C and humidity < 70% Calibration Equipment used (M&TE artifical for calibration) 10 # Cal Date (Certificate No.) Primary Standards Scheduled Calibration Power meter EPM-442A GB37480704 06-Oct-10 (No. 217-01266) Oct-11 Power sensor HP 8481A US37292783 06-Oct-10 (No. 217-01266) Oct 11 Apr-12 Heference 20 dB Attenuator SN: 5086 (20g) 29-Mar-11 (No. 217-01368) Type N mismatch combination SN 5047 2 / 06327 29-Mar-11 (No. 217-01371) Agr-12 Reference Probe ES3DV3 SN 3205 30 Apr 10 (No. ES3-3205_Apr10) Apr.11 DAE4 SN: 601 10 Jun-10 (No. DAE4-601 Jun10) Jun 11 Secundary Standards D # 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 chack Oct-(/9) in house check: Oct-11 Network Analyzer HP 8753E US37390585 S4206 In house check: Oct-11 18-Oct-01 (in house theck Oct-10) Function: Signatur Calibrated by Laboratory Technician Approved by: Katta Pokovic Technical Manager

Certificate No: DB35V2-4d043_Apr11

Page 1 of 6

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



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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** Zaughausstresse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst s

Service suisse d'étalonnequ C Servizio avizzero di teratura

Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL ConvF N/A

tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Certificate No: D835V2-4d043 April 1	Page 2 of 6		-1



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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

Measurement Conditions

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

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

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C		3445

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.33 mW / g
SAR normalized	normalized to 1W	9.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.43 mW /g ± 17.0 % (k=2)

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

Certificate No: D635V2-4d043_Apr11

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

Page

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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

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω - 3.4 jΩ	
Return Loss	- 27.2 dB	

General Antenna Parameters and Design

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

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

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

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

Design Modification by End User

The dipole has been modified with 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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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

Page **62(95)**

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

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; $\sigma = 0.88 \text{ mho/m}$; $\varepsilon_c = 40.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: ES3DV3 - SN3205; 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

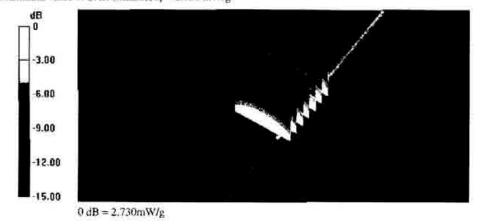
Measurement SW: DASY52, V52.6.2 Build (424)

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

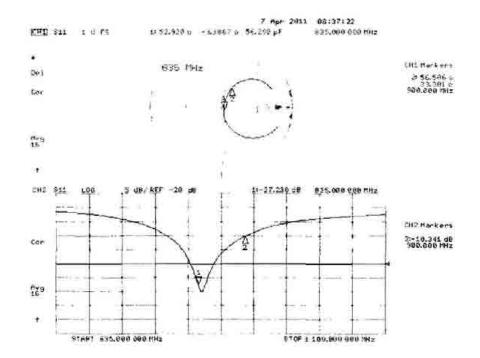


Certificate No: D835V2-4d043_Apr11

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Testing Service	Appendix D for the BlackB Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 63(95)
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

Impedance Measurement Plot for Head TSL





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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





Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura

Swiss Calibration Service

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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1900V2-545_Jan11

CALIBRATION CERTIFICATE D1900V2 - SN: 545 Object **QA CAL-05.v8** Calibration procedure(s) Calibration procedure for dipole validation kits

January 13, 2011 Calibration date:

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	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
Defenses Dake Francis	SN: 3205	30 Apr 10 (No. ES3 3205_Apr10)	Apr-11
Hoterence Proof E83DV3	014 0400		
Reference Probe ES3DV3 DAE4	SN: 601	10-Jun-10 (No. DAE4-601 "Jun10)	Jun-17
DAE4	1550 650 654	하게 되면 가장 이번에 되어 하나 하나 아니라 나는 아니라 그 아니라 그 밤 되고 있었다.	
DAE4 Secondary Standards	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-17
	SN: 601	10-Jun-10 (No. DAE4-601 "lum10) Check Date (In house)	Jun-11 Scheduled Check

Calibrated by:

Approved by:

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

issued: January 14, 2011

Certificate No: D1900V2-545_Jan11

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

Page **65(95)**

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





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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- 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:	D1900V2-545	Jan1	1
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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

Measurement Conditions

DASY Version	DASY5	V52.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The 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	in in	1111

SAR result with Head TSL

SAR averaged over 1 cm3 (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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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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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

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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Document

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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

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; $\sigma = 1.43 \text{ mho/m}$; $\varepsilon_r = 38.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

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

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

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

Peak SAR (extrapolated) = 18.648 W/kg

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



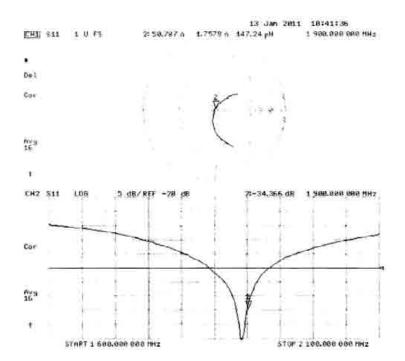
0 dB = 12.740 mW/g

Certificate No: D1900V2-545_Jan11

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Impedance Measurement Plot for Head TSL



Certificate No. D1900V2-545 Jan11 Page 6 of 6



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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





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

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RTS (RIM Testing Services)

Accreditation No. SCS 108

Certificate No. D1900V2-545_Jan13

Doject	D1900V2 - SN: 5	45	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	January 09, 2013	3 20-10-	
		onal standards, which realize the physical un robability are given on the following pages an	
		A PERSONAL TERRETORIST (A S. P.	
All calibrations have been condu	cted in the closed laborator	ry facility: emissonment temperature (22 ± 3)*0	Cand humidly < 70%
All calibrations have been condu Calibration Equipment used (M&		ry facility: emissorment temperature (22 ± 3)*(Cano humidiy < 70%
Calibration Equipment used (M&		ry facility? emissionment temperature (22 ± 3)*(Cal Date (Certificate No.)	Cand humidity < 70%. Scheduled Calibration
Calibration Equipment used (M&	TE critical for calibration)	MINERAL WAVE WARM HAVE THE REAL PROPERTY OF THE PROPERTY OF TH	e avecation for a constitute successor.
Calibration Equipment used (M& Primary Standards Power meter EPM-442A	TE critical for calibration)	Cal Date (Certificate No.)	Scheduled Calibration
Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A	TE critical for calibration) ID # GB37480704	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01040)	Scheduled Calibration Out-13 Oct-13 Apr-13
Calibration Equipment used (M& Primary Standarda Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator	TE critical for calibration) ID # GB37480704 US37292783	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01040) 01-Nov-12 (No. 217-01640)	Scheduled Calibration Oct-13 Apr-13 Apr-13
	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k)	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mur-12 (No. 217-01530)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13
Calibration Equipment used (M& Primary Standarda Power meter EPM-442A Power sensor HP 8481A Reference 20 db Attenuator Type-N mismatch combination	TE critical for calibration) ID # GB37480704 US37292783 SN: 5056 (20k) SN: 5047.3 / 06327	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Msr-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)	Scheduled Calibration Oct-13 Apr-13 Apr-13
Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4	TE critical for calibration) ID # GB37480704 US37292783 SN: 5036 (20k) SN: 5047.3 / 06327 SN: 3205	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES9-3205_Dec12)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13
Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 db Attenuator Type-N mismatch combination Relesence Probe ES3DV3	TE critical for calibration) ID # GB3/480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mur-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. E39-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13
Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Type-N mismatch combination Relibration Proba ES3DV3 DAE4 Secondary Standards	TE critical for calibration) ID # GB3/480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01040) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. ES9-3205_Doc12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check
Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 db Attenuator Type-N mismatch combination Relibrence Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A	TE critical for calibration) ID # GB3/480704 US37292783 SN: 5056 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID.# MY41092317	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 91-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. E59-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Uneck Date (in house check Oct-11)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
Calibration Equipment used (M& Primary Standarda Prower meter EPM-442A Prower sensor HP 8481A Reference 20 dB Attenuator Type-N miamatch combination Reliarence Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A HF generator R&S SMT-06	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID.# MY41092317 100005 US37390585 S4206	Cal Date (Certificate No.) 01-Nov-12 (No. 217-0(640) 01-Nov-12 (No. 217-01640) 27-Mur-12 (No. 217-01530) 27-Mur-12 (No. 217-01533) 28-Dec-12 (No. ES9-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) L'heck Llate (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-12)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Calibration Equipment used (M& Primary Standards Power sensor HP 8481A Reference 20 db Attenuator Type-N mismatch combination Relistence Probs ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A HF generator R&S SMT-06 Network Analyzer HP 8753E	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID.# MY41092317 100005 US37390585 S4206	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mur-12 (No. 217-01530) 27-Mur-12 (No. 217-01533) 28-Dec-12 (No. ES9-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in nouse) 18-Oct-02 (in nouse check Oct-11) 04-Aug-99 (in nouse check Oct-12) Function	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Calibration Equipment used (M& Primary Standarda Prower meter EPM-442A Prower sensor HP 8481A Reference 20 dB Attenuator Type-N miamatch combination Reliarence Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A HF generator R&S SMT-06	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID.# MY41092317 100005 US37390585 S4206	Cal Date (Certificate No.) 01-Nov-12 (No. 217-0(640) 01-Nov-12 (No. 217-01640) 27-Mur-12 (No. 217-01530) 27-Mur-12 (No. 217-01533) 28-Dec-12 (No. ES9-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) L'heck Llate (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-12)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13

Certificate No: D1900V2-545_Jan13

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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





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Servizio svizzero di taratura
S Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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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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 cm3 (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 ⁵ (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)

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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

Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1,198 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	November 15, 2001	

Certificate No: D1900V2-545_Jan13

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Documen

Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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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

DASY5 Validation Report for Head TSL

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

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

Phantom section: Flat Section

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

DASY52 Configuration:

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

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

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

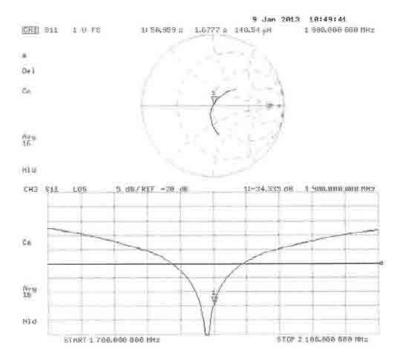
Maximum value of SAR (measured) = 12.2 W/kg



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

Testing Service	Appendix D for the BlackB Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 75(95)
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Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW

Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-545_Jan13

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Document

Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

Page **76(95)**

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





S Schweizerlacher Kalibrierdienst
C Service aulase 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

Certificate No: D1900V2-5d075_Apr11

Object	D1900V2 - SN: 5	d075	
Calibration procedure(s)	QA CAL-05.v8 Calibration proce	dure for dipole validation kits	
Carbration date	April 5, 2011		
		ional standards, which realize the physical ur robability are given on the following pages ar	COA STATE
All calibrations have been condu	cted in the closed laborato	ry facility: environment temperature (22 ± 3)*	C and humidity < 70%.
		ry facility: environment temperature (22 ± 3)*	C and hurbidity < 70%.
Calibration Equipment used (M&		And the second second	C and humidity < 70%, Scheduled Calibration
Calibration Equipment used (M&	TE critical for calibration)	ry boddy: environment temperature (22 ± 3)* Cal Date (Certificate No.) 06-Oct-10 (No. 217-01286)	
Calibration Equipment used (M& Primary Standards Power motor EPM-442A	TE critical for calibration)	Cel Date (Certificate No.)	Scheduled Calibration
Calibration Equipment used (M& Primary Stancaros Power motor EPM-442A Power sensor HP 8481A	TE critical for calibration) 10 * GB37480704	Cel Date (Certificate No.) 06-Oct-10 (No. 217-01266)	Scheduled Calibration Oct-11
Calibration Equipment used (M& Primary Standards Power moter EPM-442A	TE critical lo: calibration) 10 # GB37480704 US37292783	Cel Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01286)	Scheduled Calibration Oct-11 Oct-11
Calibration Equipment used (M& Primary Standards Power moter EPM-442A Power sensor HP 9461A Peterence 20 dB Attenuator Type-N mismation combination	TE critical for calibration) [10 # GIS37480704 US37292783 SN: 5086 (20g)	Cel Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01388)	Scheduled Calibration Oct-11 Oct-11 Apr-12
Calibration Equipment used (M& Primary Standards Fower moter EPM-442A Power sensor HP 9481A Peterence 20 dB Attenuator Typo-N mismation combination Reference Probe ES3DV3	TE critical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327	Cel Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371)	Scheduled Calibration Oct-11 Apr-12 Apr-12
Calibration Equipment used (M& Primary Standards Power moter EPM-442A Power sensor HP 9461A Peterence 20 dB Amenuator Type-N mismatch combination Reference Probe ES30V/3 DAE4	TE critical for calibration) 10 # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06927 SN: 5205	Cel Date (Certificate No.) 05-Oct-10 (No. 217-01286) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01381) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ES3-3206_Apr10)	Scheduled Caribration Oct-11 Oct-11 Apr-12 Apr-12 Apr-11
Calibration Equipment used (M& Primary Standards Power major EPM-442A Power sensor HP 9481A Pelerence 20 dB Attenuator Type N mismatch combination Reference Probe ES3DVS DAE4 Secondary Standards	TE critical for calibration) ID # G597480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06927 SN: 5047	Cel Date (Certificate No.) 06-Oct-10 (No. 217-01286) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. 253-3205, Apr10) 10-Jun-10 (No. DAE4-801, Jun10)	Scheduled Calibration Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11
Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 9481A Petersnoe 20 dB Attenuator Type N mismatch combination Petersnoe) Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A	TE critical for calibration) 10 # GB97480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06927 SN: 5205 SN: 601	Cel Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01388) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ES3-3206, Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house)	Scheduled Calibration Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11 Scheduled Check
Calibration Equipment used (M& Primary Standards Power moter EPM-442A Power sensor HP 8461A Petersnoe 20 d3 Attenuator Type-N mismation combination Petersnoe Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	TE critical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06927 SN: 5047 SN: 601 ID # MY41092317	Cel Date (Certificate No.) 06-Oct-10 (No. 217-01265) 06-Oct-10 (No. 217-01266) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ESS-3205, Apr10) 10-Jun-10 (No. DAE4-601, Jun10) Check Date (in house)	Scheduled Calibration Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11 Schaduled Check In house check: Oct-11
Calibration Equipment used (M& Primary Standards Power moter EPM-442A Power sensor HP 8461A Peterence 20 d3 Attenuator Type N mismation combination Peterence Probe ES30V's DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	TE critical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06927 SN: 3206 SN: 601 ID # MY41092317 100055 US37380585 \$4206	Cel Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ES3-3206_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 18-Oct-01 (in house check Oct-09) 18-Oct-01 (in house check Oct-10)	Scheduled Caribration Oct-11 Oct-11 Apr-12 Apr-12 Apr-12 Apr-11 Jun-11 Schaduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11
Calibration Equipment used (M& Primary Standards Power select EPM-442A Power select EPM-442A Power select EPM-442A Pelerence 20 dB Attenuator Type-N mismatch combination Political EPM-830V3 DAE4 Secondary Standards Power select EPM-8481A RF generator R&S SMT-06 Network Analyzor HP 8753E	TE critical for calibration) [ID # GIS97480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06927 SN: 3205 SN: 601 [ID # MY41092317 100055 US37390585 \$4206	Cel Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 29-Mar-11 (No. 217-0138) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ES3-3206, Apr10) 10-Jun-10 (No. DAE4-601, Jun-10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function	Scheduled Cambration Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11 Scheduled Check In house check Oct-11 In house check Oct-11 In house check Oct-11
Calibration Equipment used (M& Primary Standards Power motor EPM-442A Power sensor HP 9481A Pelerence 20 dB Attenuator	TE critical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06927 SN: 3206 SN: 601 ID # MY41092317 100055 US37380585 \$4206	Cel Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ES3-3206_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 18-Oct-01 (in house check Oct-09) 18-Oct-01 (in house check Oct-10)	Scheduled Caribration Oct-11 Oct-11 Apr-12 Apr-12 Apr-12 Apr-11 Jun-11 Schaduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11

Certificate No. D1900V2-5d075_Apr11

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

Page

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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 Zeughaussusses 43, 8004 Zurich, Switzerland





S Sohweizerischer Kallbrierdienst
C Service sulsse d'étalennage
Servizie svizzere di baratura
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

Multileteral Agreement for the recognition of calibration certificates

Glossary:

TSL

tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

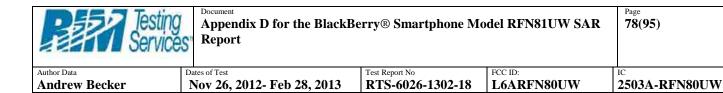
Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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



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

Head TSL parameters

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.8 ± 6 %	1.41 mho/m ± 6 %
Head TSL temperature during test	(21.3 ± 0.2) °C	****	3777

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	40.4 mW/g ± 17.0 % (k=2)

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

Certificate No: D1900V2-5d075_April 1



Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 ns
The state of the s	

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 24, 2006

Certificate No: D1900V2-5d075_Apr11

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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

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

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 SN3205; ConvF(5.09, ≤09, 5.09); Calibrated, 30.04,2010
- Sensor-Surface: 3mm (Machanical Surface Detection)
- Electronics, DAE4 Sn601; Calibrated: 10.06,2010
- Phantom: Flat 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)

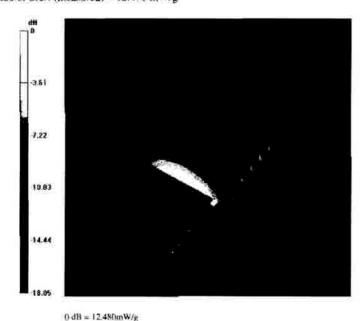
Head / d=10mm, Pin=250 mW / Cube 0:

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

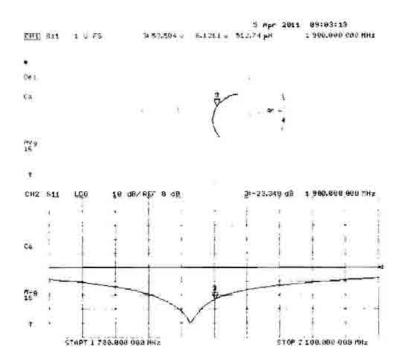


Certificate No: D1900V2-5d075_Apr11

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Impedance Measurement Plot for Head TSL





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Author Data **Andrew Becker** Dates of Test

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L6ARFN80UW

2503A-RFN80UW

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





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

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RTS (RIM Tenting Services)

Accreditation No.: SCS 108

Certificate No: D2450V2-747_Nov11

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Object	D2450V2 - SN: 7	AT A STATE OF AN AN	Ages The Contract of
Calibration procedure(s)	QA CAL-05.v8 Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	November 09, 20		100 July 100
		onel standards, which realize the physical un robability are given on the following pages an	
		y facility: environment temperature (22 ± 3)*	C and humidity < 70%.
	TE critical for calibrations		
Calibration Equipment used (M&	L China in Community		
	ID #	Cal Date (Certificate No.)	Scheduled Celibration
rimary Standards	Horse	Cai Date (Certificate No.) 05-Oct-11 (No. 217-01451)	Scheduled Calibration Oct-12
Primary Standards	ID #		
Primary Standards Cower meter EPM-442A Cower sensor HP 8481A	ID # GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Atteruator	ID # GB37480704 UB37292783	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451)	Oct-12 Oct-12
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination	ID # GB37480704 UB37292783 SN: 5086 (20g)	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mat-11 (No. 217-01368)	Oct-12 Oct-12 Apr-12
Primary Standards Fower meter EPM-442A Fower sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3	ID # GB37480704 UB37292783 SN: 5086 (20g) SN: 5047.2 / 06327	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371)	Oct-12 Oct 12 Apr-12 Apr-12
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Prote ES3DV3 DAE4	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047-2 / 06327 SN: 3205	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. ES3-3205_Apr11)	Oct 12 Oct 12 Apr-12 Apr-12 Apr-12
Primary Standards Power meter EPM-442A Power sensor HP 9481A Reference 20 dB Atteruator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. ES3-3205, Apr11) 04-Jul-11 (No. DAE4-601_Jul11)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Jul-12
Primary Standards Power meter EPM-842A Power sensor HP 8481A Reference 20 dB Atteruator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A	ID # GB37480704 UB37292783 SN: 5086 (209) SN: 5047.2 / 06327 SN: 3205 SN: 601	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. ES3-3205, Apr11) 04-Jul-11 (No. DAE4-601_Jul11) Check Date (in house)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Jul-12 Jul-12 Scheduled Check
Calibration Equipment used (M& 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 RAS SMT-06 Network Analyzer HP 8753E	ID # GB37480704 UB37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601 ID # MY41092317	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. ES3-3205, Apr11) 04-Jul-11 (No. DAE4-601_Jul11) Check Date (in house)	Oct-12 Oct 12 Apr-12 Apr-12 Apr-12 Jul-12 Scheduled Check 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 ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator RAS SMT-06	ID # GB37480704 US37292783 SN: 5086 (209) SN: 5047-2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4266	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. 253-3205-Apr11) 04-Jul-11 (No. DAE4-601_Jul11) Chack Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Jul-12 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
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Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator RAS SMT-06	ID # GB37480704 US37292783 SN: 5086 (209) SN: 5047-2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4266	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. 253-3205-Apr11) 04-Jul-11 (No. DAE4-601_Jul11) Chack Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Jul-12 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
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Certificate No: D2450V2-747_Nov11

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Test Report No

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Author Data Andrew Becker Dates of Test Nov 26, 2012- Feb 28, 2013

RTS-6026-1302-18

FCC ID: L6ARFN80UW

2503A-RFN80UW

Calibration Laboratory of Schmid & Partner Engineering AG Zeughnusstrasse 43, 8004 Zurleh, Switzerland





Schweizerischer Kalibrierdienst S Service suisse d'étalonnage C 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:

tissue simulating liquid TSL

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

Calibration is Performed According to the Following Standards:

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

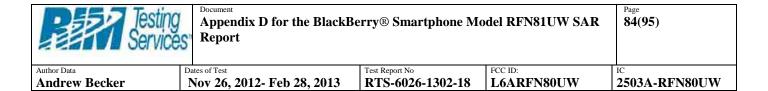
Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Certificate No: D2450V2-747 Nov11	Page 2 of 6	



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.

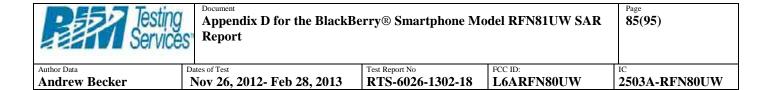
	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.7 ± 6 %	1.84 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

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



Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1.161 ns

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

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

No expressive force must be specified to the dipole arms, because they might hand 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.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 01, 2003

Certificate No: D2450V2-747_Nov11



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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

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; $\sigma = 1.84 \text{ mho/m}$; $\varepsilon_r = 37.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

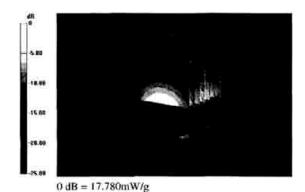
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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)

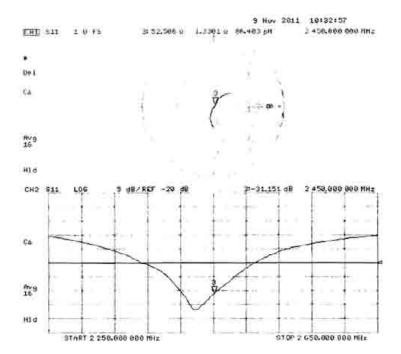
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



Testing Service	Appendix D for the BlackB Report	erry® Smartphone Mo	odel RFN81UW SAR	Page 87(95)
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

Impedance Measurement Plot for Head TSL





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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





S Schweizerischer Kalibrierdienst 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

Cartillana No. DSGH+V2-1033 Nov11

Accreditation No.: SCS 108

	ERTIFICATE		CHA T
Object	D5GHzV2 - SN:	1033	1-84(8.84) 1
Calibration procedure(s)	QA CAL-22.v1 Calibration proce	dure for dipole validation kits bet	ween 3-6 GHz
Calibration date:	November 15, 20	Men	B. B. Carrier
		ional standards, which realize the physical un robability are given on the following pages ar	
All calibrations have been conduc	eted in the closed laborator	ry facility: environment temperature (22 ± 3)°	C and humidity < 70%.
Calibration Equipment used (M&)	TE cotical for catibeation)		
Da Didigit Equipment does (inc.	a cinical for canadaying		
240	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Primary Standards		Cal Date (Certificate No.) 05-Oct-11 (No. 217-01451)	Scheduled Calibration Oct-12
Primary Standards Power meter EPM-442A	10 *	The state of the s	
Primary Standards Power meter EPM-442A Power sensor HP 9481A	ID # GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Primary Standards Power meter EPM-442A Power sensor HP 9481A Reference 20 dB Attenuator Type N mismatch combination	ID # GB37490704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451)	Oct-12 Oct-12
Primary Standards Power meter EPM-442A Power sensor HP 0481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe EX3DV4	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EX3-3503, Marti)	Oct-12 Oct-12 Apr-12 Apr-12 Mar-12
Primary Standards Power meter EPM-442A Power sensor HP 0481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe EX3DV4	ID # GB37490704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371)	Oct-12 Oct-12 Apr-19 Apr-18
Primary Standards Power meter EPM-442A Power sensor HP 9461A Reference 20 dB Attenuator Type N mismatch combination Reference Probe EX3DV4 DAE4	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EX3-3503, Marti)	Oct-12 Oct-12 Apr-12 Apr-12 Mar-12
Primary Standards Power mater EPM-442A Power sensor HP 0481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8481A	ID # GB37490704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 601	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01388) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EX3-3503 Mart 1) 04-Jul-11 (No. DAE4-601_Jul11)	Oct-12 Oct-12 Apr-12 Apr-12 Mar-12 Jul-12
Primary Standards Power meter EPM-42A Power sensor HP 0481A Reference 20 dR Attenuator Type N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8481A	ID # GB37490704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 601	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01398) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EX3-3503 Mart1) 04-Jul-11 (No. DAE4-601_Jul11) Check Date (in house)	Oct-12 Oct-12 Apr-12 Apr-12 Mar-12 Jul-12 Scheduled Check
Primary Standards Power meter EPM-442A Power sensor HP 0481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 601 ID # MY41092317	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01378) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EX3-3503 Mart I) 04-Jul-11 (No. DAE4-601_Jul11) Check Date (in house)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Mar-12 Jul-12 Scheduled Check In house check, Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 0481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards	ID # GB37490704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 601 ID # MY41092317 100005 US37390585 S4206	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01458) 29-Mar-11 (No. 217-01388) 29-Mar-11 (No. EX3-3503 Mart 1) 04-Jul-11 (No. DAE4-601_Jul11) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Mar-12 Jul-12 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-12
Primary Standards Power meter EPM-442A Power sensor HP 0461A Reference 20 dB Attenuator Type N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8481A RF ganerator R&S SMT-06 Network Analyzer HP 8753E	ID # GB37490704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01358) 29-Mar-11 (No. 217-01358) 29-Mar-11 (No. EX3-3503 Mart 1) 04-Jul-11 (No. DAE4-601_Jul11) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Mart-12 Jul-12 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 0461A Reference 20 dB Attenuator Type N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8461A RF ganerator R&S SMT-06 Network Analyzer HP 8753E	ID # GB37490704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 601 ID # MY41092317 100005 US37390585 S4206	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01458) 29-Mar-11 (No. 217-01388) 29-Mar-11 (No. EX3-3503 Mart 1) 04-Jul-11 (No. DAE4-601_Jul11) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Mar-12 Jul-12 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-12
Primary Standards Power meter EPM-442A Power sensor HP 0481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37490704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01358) 29-Mar-11 (No. 217-01358) 29-Mar-11 (No. EX3-3503 Mart 1) 04-Jul-11 (No. DAE4-601_Jul11) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Mar-12 Jul-12 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-12

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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





Schweizerischer Kalibrierdienst Service suisse d'étalonnage

C Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

tissue simulating liquid TSL

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Certificate No: D5GHzV2-1033 Nov11 Page 2 of 8



$\label{lem:sarphone} \textbf{Appendix D for the BlackBerry} \& \textbf{Smartphone Model RFN81UW SAR} \\ \textbf{Report}$

Page **90(95)**

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

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	****	See

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm3 (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	1000	

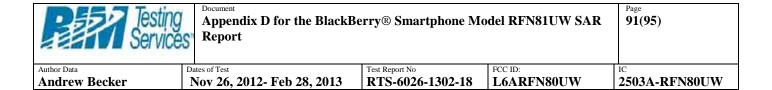
SAR result with Head TSL at 5500 MHz

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 cm3 (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

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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	33.7 ± 6 %	5.03 mbo/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		Pres.

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm3 (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)

Certificate No: D5GHzV2-1033_Nov11



Document

Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report

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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

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 μΩ			
Return Loss	- 22.6 dB			

General Antenna Parameters and Design

Electrical Delay (one direction)	1.202 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG			
Manufactured on	July 09, 2004			

Certificate No: D5GHzV2-1033_Nov11

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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

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; $\sigma = 4.46 \text{ mho/m}$; $\varepsilon_t = 34.6$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: f = 5500 MHz; $\sigma = 4.75$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³. Medium parameters used: f = 5800 MHz; $\sigma = 5.03 \text{ mbo/m}; \ \varepsilon_r = 33.7; \ \rho = 1000 \text{ kg/m}^3$

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/g

Maximum value of SAR (measured) = 18.725 mW/g

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

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

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

Peak SAR (extrapolated) = 35.056 W/kg

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

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

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

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

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

Peak SAR (extrapolated) = 33.743 W/kg

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

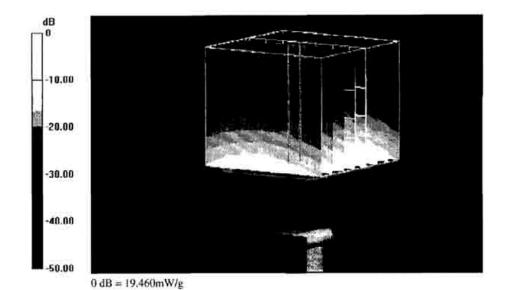
Maximum value of SAR (measured) = 19.463 mW/g

DESCRIPTION OF THE PROPERTY OF THE		Management and the			

Certificate No. D5GHzV2-1033_Nov11

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Testing Service	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report			
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

Impedance Measurement Plot for Head TSL

