≅BlackBerry	Appendix D for the BlackBer Report Rev 2	ry® Smartphone Mod	el RFL111LW SAR	Page 1(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

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

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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

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





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Accreditation No.: SCS 108



Certificate No: ES3-3225_Jan12

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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Calibration Laboratory of Schmid & Partner Engineering AG Zeobasstrass 43, 804 Zurich, Seitserland





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Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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Glossary:

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

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

Polarization o o rotation around probe axis

Potarization 9 3 rotation around an axis that is in the plane normal to probe axis (at measurement center).

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 3 = 0 (f s 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 z 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

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D-10-4 D-10-10-10-10-10-10-10-10-10-10-10-10-10-	

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ES30V3 - SN:3225

January 11, 2012

Probe ES3DV3

SN:3225

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

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

Certificate No: ES3-3225_Jan12

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

E530V3-5N: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 (µW/(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	68	C dB	WR m/V	Unc ^t (k=2)
10000 CW	CW	0.00	X 0.00	0.00	0.00	1.00	107.7	\$1.7%
		7,533	Y	0.00	0.00	1.00	113.4	100
			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%.

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A The uncertainties of NormX,Y,Z do not affect the E⁴-fact uncertainty inside TSL (see Pages 5 and 6).

Numerical treadustion 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.

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

ES30V3-SN:3225

January 11, 2012

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.42	6.42	6.42	0.27	2.04	± 12.0 %
900	41.5	0.97	6.06	6.06	6.06	0.35	1.74	± 12.0 %
1810	40.0	1.40	5.23	5.23	5.23	0.73	1.21	± 12.0 %
1950	40.0	1.40	4.98	4.98	4.98	0.58	1.41	± 12.0 %
2450	39.2	1,80	4.50	4.50	4.50	0.79	1.26	± 12.0 %
2600	39.0	1.96	4.32	4.32	4.32	0.77	1.32	± 12.0 %

Certificate No: ES3-3225_Jan12

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

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

ES3DV3- SN 3225

January 11, 2012

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

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^C	Relative Permittivity	Conductivity (Sim)	ConvF X	Convf Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.27	6.27	6.27	0.36	1.74	± 12.0 %
900	55.0	1.05	6.07	6.07	6.07	0.29	2.02	± 12.0 %
1810	53.3	1.52	4.92	4.92	4.92	0.50	1.57	± 12.0 %
1950	53.3	1.52	4.87	4.87	4.87	0.59	1.49	± 12.0 %
2450	52.7	1.95	4.30	4.30	4.30	0.68	1.16	± 12.0 %
2600	52.5	2.16	4.12	4.12	4.12	0.60	0.99	± 12.0 %

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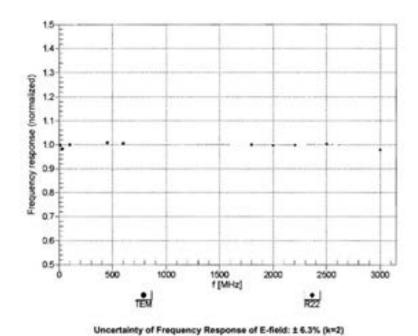
² Frequency validity of ± 100 MHz only applies for DASY vt.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ComiF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
⁸ At frequencies below 3 GHz. the validity of fissue parameters (c and n) can be referred to ± 10% if signif compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of fissue parameters (c and n) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target fissue parameters.

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ES30V3-SN:3225

January 11, 2012

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



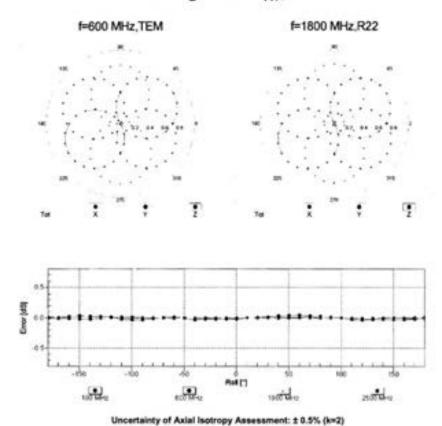
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E530V3- 5N:3225 January 11, 2012

Receiving Pattern (\$), 9 = 0°



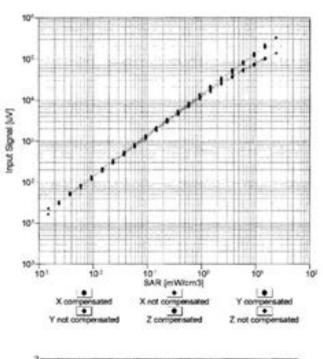
Certificate No: ES3-3225_Jan12 Page 8 of 11

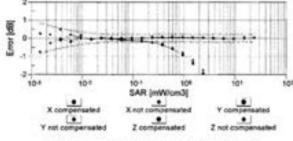
≅BlackBerry	Appendix D for the BlackBer Report Rev 2	Page 10(139)		
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
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ES30V3- SN:3225

January 11, 2012

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





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

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ES30V3-SN3225 January 11, 2012 **Conversion Factor Assessment** f = 900 MHz, WGLS R9 (H_convF) f = 1810 MHz, WGLS R22 (H_com/F) Deviation from Isotropy in Liquid Error (¢, 3), f = 900 MHz 1.0 0.8 0.6 04 0.2 0.0 -0.2 -0.4 -0.6 180 225 -1.0 -0.8 -0.5 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

E530V3- SN 3225 January 11, 2012

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

Other Probe Parameters

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

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	December 10-12, 2014	Rev 3		

Calibration Laboratory of Schmid & Partner Engineering AG Zeoglassetisses 43, 8664 Zurich, Seitzerland





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RTS (RIM Testing Services)

Accreditation No.: SCS 108

Contilicate No: ES3-3225_Jan13

CALIBRATION CERTIFICATE Object ES3DV3 - SN:3225 QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure(x) Calibration procedure for dosimetric E-field probes January 10, 2013 Califoration date: This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (\$6). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility environment temperature (22 s 2)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration) Cai Date (Certificate No.) Scheduled Calibration Prenary Standards Ю 29-Mai: 12 (No. 217-01508) G841293874 Apr-13 Power meter E44198 29-Mar-12 (No. 217-01508) Power sensor E4412A MY41498087 Age-13 Reference 3 dB Attenuetor 5N: 85054 (3c) 27-Mar 12 (No. 217-01531) April 13 Reference 20 dB Attenuator SN: 55086 (\$0b) 27-Mar-12 (No. 217-01529) Apr-13 Reference 30 dR Attenuator 27-Mar-12 (No. 217-01532) SN: 55129 (30b) Apr-13 28-Dec-12 (No. ES3-3013_Dec12) SN: 3013 Dec-13 Reference Probe ES3DV2 20-Jun-12 (No. DAC#-660, Jun 12) DAE4 5N: 660 Jun 13 Secondary Standards Check Date (in house) Scheduled Check RF generator HP 8648C U53640U01700 4-Aug-99 (in house check Apr-11) In house check: April 13 Network Analyzer HP 8753E 18-Oct-01 (in house check Oct-12) In house check: Oct-13 US37390585 Function Laboratory Technician Calibrated by: Jeton Kestrali Approved by: Katja Pokovic **Technical Manager** Issued: January 14, 2015 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

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	December 10-12, 2014	Rev 3		

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





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Accreditation No.: SCS 108

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Glossary:

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

CF A, B, C, D

DCP

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

Polarization e e rotation around probe axis

Polarization 5

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

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 8 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
 NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of Com/F.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z; Bx,y,z; Cx,y,z; 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.
- Corref 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 * CorvF whereby the uncertainty corresponds to that given for CorvF. A frequency dependent CorvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe sxis). No tolorance required.

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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 15(139)
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	December 10-12, 2014	Rev 3		

E530V3 - 5N: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, Jan 13

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≅ BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 16(139)
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	December 10-12, 2014	Rev 3		

ES3DV3-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 (s/V)(V/m) ²) ^A	1.29	1.19	1.31	± 10.1 %
DCP (mV) [®]	100.5	101.5	99.9	

Modulation Calibration Parameters

UID	Communication System Name		A Bb	B dBõV	¢	D dB	VR mV	Unc (k=2)
0	CW	- X	0.0	0.0	1.0	.0.00	-157.5	12.7 %
		Y.	0.0	0.0	1.0		158.4	
		2	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%.

^b The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).
^b Numerical Sneedzation parameter: uncertainty not required.
^c 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 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

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 (Sim)	Convf X	Conv# 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	4.66	4.65	0.61	1.63	±12.0%
2600	39.0	1.98	4.43	4.43	4.43	0.80	1,32	± 12.0 %

"Frequency validity of a 100 MHz only applies for DASY vt.4 and higher (see Page 2), else 8 is restricted to a 50 MHz. The uncertainty is the RSS of the Convil succertainty at calibration frequency and the uncertainty for the indicated frequency band.

"At requencies below 3 GHz, the validity of fissue parameters (i. and ii) are three-band to a 10% if liquid compensation formula its applied to research SAM values. At frequencies above 3 GHz, the validity of fissue parameters (ii and iii) is restricted to a 5%. The uncertainty is the RSS of the Convil uncertainty for indicated target feature parameters.

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≅BlackBerry	Appendix D for the BlackBer Report Rev 2	ry® Smartphone Mod	el RFL111LW SAR	Page 18(139)
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E530V3-SN:3225

January 10, 2013

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

Calibration Parameter Determined in Body Tissue Simulating Media

r (MHu) ^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	± 12.0 %
900	55.0	1.05	6.12	6.12	6.12	0.73	1.25	± 12.0 5
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	x 12.0 %

Certificate No: ES3-3225, Jan13

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[&]quot;Frequency validity of a 100 MHz only applies for DASY vt.4 and higher (see Page 2), site 8 is restricted to a 50 MHz. The uncertainty is the RSS of the ConsF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

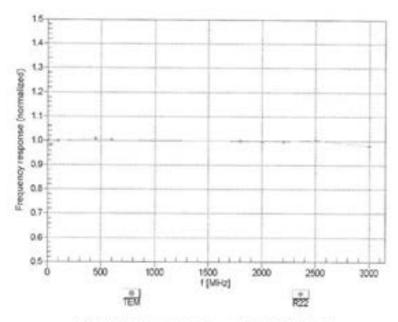
"At trequencies below 3 CHz, the validity of feases parameters (s and is) as reliased to a 10% if topic compensation formula is applied to measured SAR values. At frequencies above 3 CHz, the validity of feases parameters (s and is) is restricted to a 5%. The uncertainty is the RSS of the ConsF uncertainty for indicated larged leaves parameters.

## BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 19(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

ES30V3-5N:3225

January 10, 2013

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



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

Certificate No: ES3-3225_Jan13

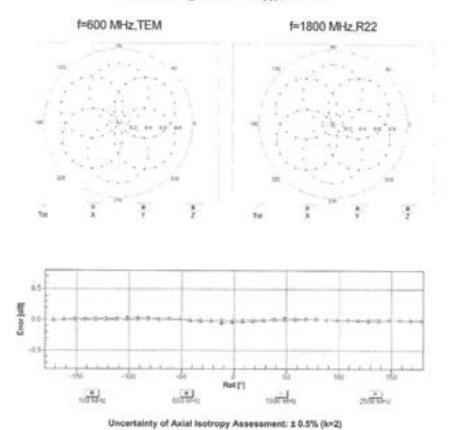
Page 7 of 11.

≅BlackBerry	Appendix D for the BlackBer Report Rev 2	ry® Smartphone Mod	el RFL111LW SAR	Page 20(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

ES3DV3-8N:3225

January 10, 2013

Receiving Pattern (\$\phi\$), \$\text{9} = 0°



Certificate No: E53-3225_Jan13

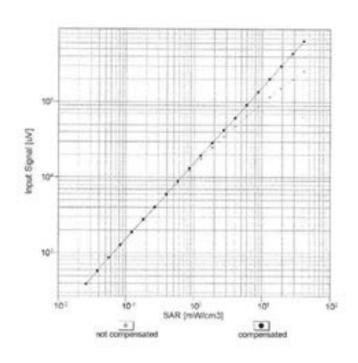
Page 8 of 11

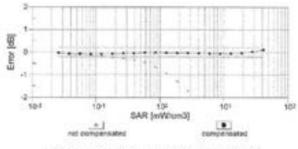
≅BlackBerry				Page 21 (139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

ES3DV3-5N:3225

January 10, 2013

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



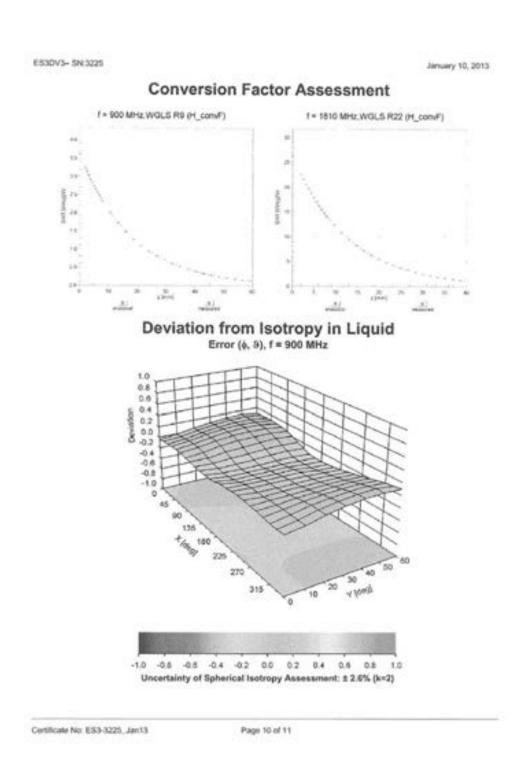


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: ES3-3225, Jan 13

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≅BlackBerry	Appendix D for the BlackBer Report Rev 2	rry® Smartphone Mod	el RFL111LW SAR	Page 22(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW



≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 23(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

E53DV3- 5N 3225

January 10, 2013.

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

Other Probe Parameters

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

Certificate No: ES3-3225_Jan13

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≅BlackBerry	Appendix D for the BlackBer Report Rev 2	rry® Smartphone Mod	el RFL111LW SAR	Page 24(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Calibration Laboratory of Schmid & Partner Engineering AG Zmaghausstrasse 43, 8064 Zurich, Switzerland





S Schweizerischer Kalibrierdienst Service suisse d'étalormage 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)

Certificate No: EX3-3592_Nov12

Accreditation No.: SCS 108

CALIBRATION CERTIFICATE

Овуест

EX3DV4 - SN:3592

Cultination 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 tracopolity to national standards, which realize the physical units of resistances (50). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	(0)	Cal Dino (Certificate No.)	Scheduled Calibration
Power meter E4419B	0841293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41409067	29-Mar-12 (No. 217-01508)	Age-13
Reference 3 dfl Attenuator	5N; 55054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dR Attenuator	SN: 55086 (20b)	27-Mar-12 (No. 217-01529)	Age-13
Reference 30 dB Attenuator	SN: 55129 (30b)	27-Mar-12 (No. 217-01532)	Apr.13
Reference Probe ESSDV2	SN: 3013	29-Dec-11 (No. ES3-3013, Dec11)	Dec-12
DAE4	SN: 650	20-Jun 12 (No. DAE4-860, Jun 12)	Jun-13
Secondary Standards	(0	Check Date (in house)	Scheduled Check
RF generator HP 8640C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Anatyser HP 8753E	US37390865	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Certificate No. EX3-3592_Nov12

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≅BlackBerry	Appendix D for the BlackBerr Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW		
	December 10-12, 2014	Rev 3				

Calibration Laboratory of Schmid & Partner Engineering AG Zeophaustrasse 13, 8094 Zurich, Switzerland





S Schweizerischer Kallbriendenst C Service suitse d'étalonnage Service svitzers di brasture Swiss Celibration Service

Accreditation No.: SCS 108

Accredited by the Sens Accreditation Sensoe (SAS)

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

Glossary:

TSL tissue simulating liquid NORMx.y.z sensitivity in ties space ConvF sensitivity in TSL / NORMx.y.z dode compression point

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

Polarization o e 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 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 h = 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 ConvP).
- 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 lip (on probe axis). No tolerance required.

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≅BlackBerry	Appendix D for the BlackBerr Report Rev 2	y® Smartphone Mode	el RFL111LW SAR	Page 26(139)
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

EX3DV4 - SN:3592

November 14, 2012

Probe EX3DV4

SN:3592

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

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

Certificate No: EX3-3592_Nov12

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≅BlackBerry	Appendix D for the BlackBer Report Rev 2	Page 27 (139)		
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

EX3DV4-SN:3562 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) ⁴	0.49	0.47	0.41	± 10.1 %	
DCP (mV) ^B	95.2	96.1	100.6		

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C d8	VR mV	Une ¹ (k=2)
D	CW	0.00 X 0.0	0,0	0.0	1.0	121,4	13.0 %	
			· 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

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The uncertainties of NormX,Y,Z do not affect the E²-held 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.

≅BlackBerry	Appendix D for the BlackBer Report Rev 2	ry® Smartphone Mod	el RFL111LW SAR	Page 28(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

EX3DV4-5N:3552

November 14, 2012

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

Calibration Parameter Determined in Head Tissue Simulating Media

r (MHz) ^c	Relative Permittivity	Conductivity (5/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
2600	39.0	1.96	6.45	6.45	6.45	0.53	0.79	± 12.0 %
5200	36.0	4,66	4.73	4.73	4.73	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.28	4.28	4.28	0.44	1.80	+13.1%
5800	35.3	5.27	4.12	4.12	4.12	0.48	1.80	± 13.1 %

⁶ Prequency velidity of a 100 MHz only applies for CASY viii 4 and higher (see Page 2), else 8 is cepticized to ± 50 MHz. The uncertainty is the RSS of the Convil' uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
⁷ As frequencies below 3 GHz, the velocity of favors parameters (i. and ii) can be relieved to ± 10% if figure compression formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of fasors parameters (i. and ii) is restricted to x 5%. The uncertainty is the RSS of the Convil' uncertainty for indicated target tissue parameters.

Certificate No: EX3-3592_Nov12

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≅ BlackBerry	Appendix D for the BlackBerr Report Rev 2	Page 29 (139)		
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

EX30V4- SN 3592

November 14, 2012

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

Calibration Parameter Determined in Body Tissue Simulating Media

r (MHz) ^c	Relative Permittivity	Conductivity (Sim)	Convf X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
2600	52.5	2.16	6.59	6.59	6.59	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.02	4.02	4.02	0.48	1.90	± 13.1 %
5500	48.6	5.85	3.66	3.66	3.66	0.55	1.90	± 13.1 %
5800	48.2	6.00	3.57	3.57	3.57	0.57	1.90	± 13.1 %

⁶ Frequency validity of z 100 fafet only applies for DASY v4.4 and higher (see Page Z), else it is redirided to z 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
⁷ At heapencies below 3 GHz, the validity of tissue parameters (ii and ii) can be relaxed to z 10% if liquid compensation formula is applied to recovered SAR values. All frequencies acrows 3 GHz, the validity of tissue parameters (v and v) is restricted to z 0%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

Certificate No: EX3-3592_Nov12

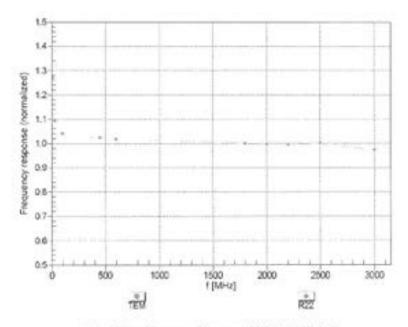
Page 6 of 11.

### BlackBerry	Appendix D for the BlackBerr Report Rev 2	Page 30 (139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

EX3DV4- SN:3582

November 14, 2012

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



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

Certificate No. EX3-3592_Nov12

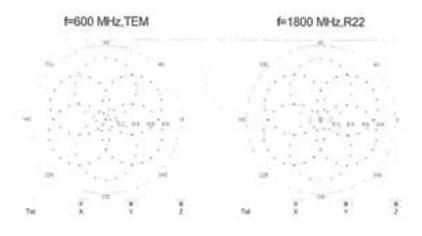
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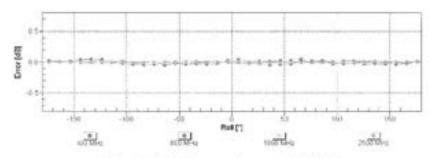
≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 31(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

EX3DV4- SN 3592

November 14, 2012

Receiving Pattern (\$), 9 = 0°





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

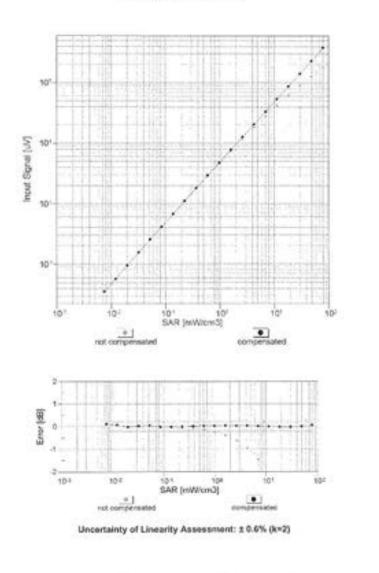
Certificate No: EX3-3592_Nov12

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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 32(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

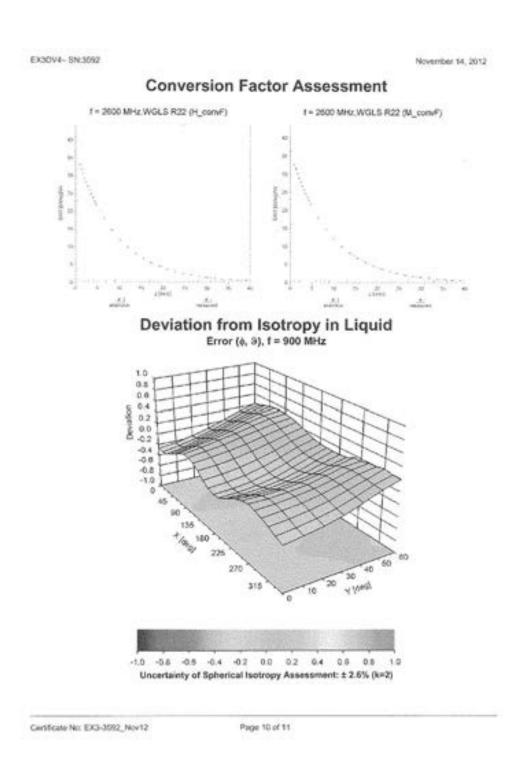
EX3DV4- SN3592 November 14, 2012

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



Certificate No: EX3-3592_Nov12 Page 9 of 11

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 33(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		



≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 34(139)
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

EX3DV4-5N:3502

November 14, 2012

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

Other Probe Parameters

Sensor Amangament	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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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 35(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW



≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 36(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Calibration Laboratory of Schmid & Partner Engineering AG

Engineering AG Zooghausstresse 43, 8004 Zurich, Switzerland





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C Service suinze d'étalonnage
S Servicie suinzere di tarature
Swiss Californius Service

Accreditation No.: 8CS 108

Accredited by the livess Accreditation Service (SAS)

The Swiss Accreditation Service is one of the eignaturies to the EA. Multilistural Agreement for the recognition of calibration contificates

Glossary:

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

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

Polarization φ o rotation around probe axis

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

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

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters;

- NORMx,y,z: Assessed for E-field polarization 5 = 0 (f s 900 MHz in TEM-cell; f > 1800 MHz. R22 varveguide).
 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 inscrization parameters sessessed 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.
- Const and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for t < 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 NORMs_v.z * Const whereby the uncertainty corresponds to that given for Const. A frequency dependent Const is used in DASY version 4.4 and higher which allows extending the validity from z 50 MHz to z 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip
 (on probe tixls). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMs (no uncertainty required).

Continue No: EX3-3592, Nov14

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≅BlackBerry	Appendix D for the BlackBerr Report Rev 2	Page 37(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

EX30V4 - SN 3692

November 10, 2014

Probe EX3DV4

SN:3592

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

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

Certificate No. EX3-3592 Nov14

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≅ BlackBerry	Appendix D for the BlackBerr Report Rev 2	Page 38(139)		
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

EXIOV4-SN:3592

November 10, 2014

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z.	Une (kn2)
Norm (y/V/(V/m) ²) ⁴	0.48	0.47	0.40	±10.1%
DCP (m/V)*	95.2	98.0	98.8	-

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	c	D dB	WR mV	Unc* (k=2)
0 C	CW	×	0.0	0.0	1.0	0.00	145.9	10.5 %
		. Y	0.0	0.0	1.0		150.9	
		- 2	0.0	0.0	1.0		.149.1	

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

Certificate No: EX3-3592_Nov14

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[^] The uncertainties of Noor K.Y.Z. do not affect the E² -field uncertainty in side TSL (see Plages 5 and 4). *Nounteriod theorization parameter: uncertainty not required. *I Uncertainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the field usins.

≅BlackBerry	Appendix D for the BlackBer Report Rev 2	Page 39(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

EX3DV4-SN:3502

November 10, 2014

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

Calibration Parameter Determined in Head Tissue Simulating Media

r (MHz) ^e	Relative Permittivity*	Conductivity (Sim)	ComF X	ConvF Y	Com# Z	Alpha ¹	Depth (mm)	Unct. (k=2)
2600	39.0	1.96	6.80	8.80	6.80	0.36	0.93	± 12.0 %
5250	35.9	4.71	4.63	4.63	4.63	0.35	1.80	±13.1%
5600	35.5	5.07	4.20	4.20	4.20	0.40	1.60	113.15
5750	35.4	5.22	4.34	4.34	4.34	0.40	1.80	A 13.1 %

[&]quot; Frequency relidity above 300 MHz of ± 100 MHz only applies for CASY v1.4 and higher (see Page 2), also it is restricted to a 50 MHz. The Firequency reliably above 300 MHz of ± 100 MHz only applies for DASY v1.4 and higher (see Page 2), after it is restricted to a 50 MHz. The uncertainty of collection frequency and fire variations of the industed frequency band. Frequency welf-bits below 30 MHz is ± 10, 25, 40, 50 and 70 MHz for Constitution 50 MHz, 100 and 200 MHz is expectively. Above 5 GHz frequency validity can be extended to ± 190 MHz, the constitution of the constitution

Certificate No: EX3-3592 Nov14

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*** BlackBerry	Appendix D for the BlackBerr Report Rev 2	Page 40(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

November 10, 2014 EX30V4 SN:3592

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

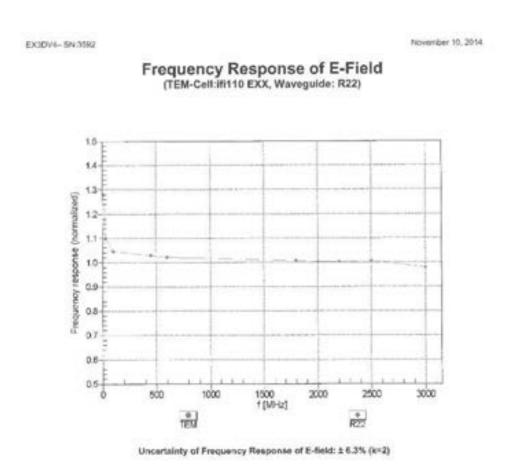
Calibration Parameter Determined in Body Tissue Simulating Media

r (MHz) ^c	Relative Permittivity	Conductivity (Sim)	Com/F X	ComyF Y	ConvF Z	Alpha ^d	Depth (mm)	Unct. (x=2)
2600	52.5	2.18	6.84	6.64	6.84	0.78	0.62	±12.0%
5250	48.9	5.36	4.06	4.06	4.06	0.45	1.90	±13.1%
5600	48.5	5.77	3.78	3,78	3,78	0.45	1.90	± 13.1 %
5750	48.3	5.94	3.81	3.81	3.81	0.50	1.90	± 13.1 %

^{*} Enquency validity above 300 MHz of a 100 MHz only applies for QASY v4.4 and higher (see Page 7), also it is nestricted to a 50 MHz. The uncontainty is the RGS of the Conet uncontainty at delivation frequency and the uncentainty for the indicated his service toward. Frequency validity below 300 MHz is a 10, 25, 40, 50 and 70 MHz for Conet assessments at 30, 64, 128, 160 and 220 MHz respectively. Above 5 GHz throughout validity can be extended to a 110 MHz.
At these mechanistics 5 GHz, the validity of basic payameters (it and in) can be released to a 10% if injurit compensation formula in popied to measured SAH values. At frequencies above 3 GHz, the validity of tiesue parameters is revially an estricted to a 5%. The uncertainty is the RSS of the Conet uncortainty is the indicated departments.
Applicable are determined during unblassion. SPEAD warmts that the remaining deviation due to the transfer after our potential in always loss than 1.7% for frequencies below 3 CHz and heliow ± 2% for inscurances between 3.6 GHz at any distance larger from helf the probe tip character from the boundary.

Certificate No: EX3-3592_Nov14

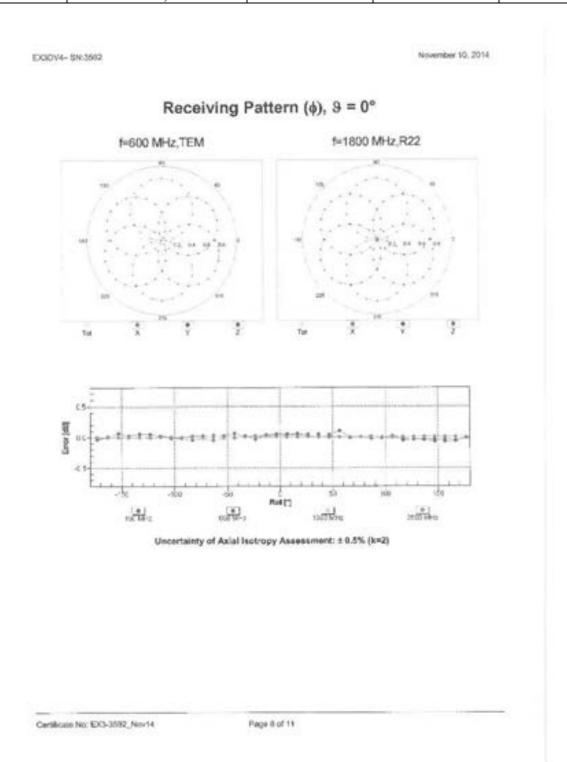
≅ BlackBerry	Appendix D for the BlackBern Report Rev 2	Page 41(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		



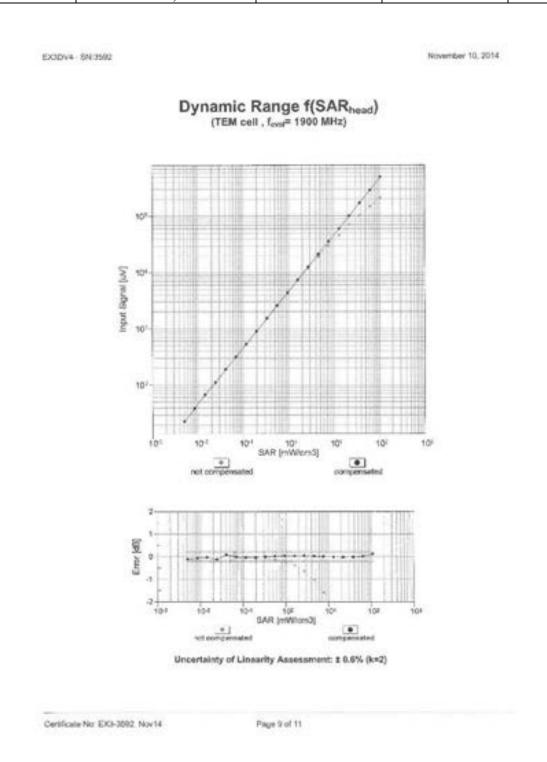
Certificate No: EXX-0592, Nov14

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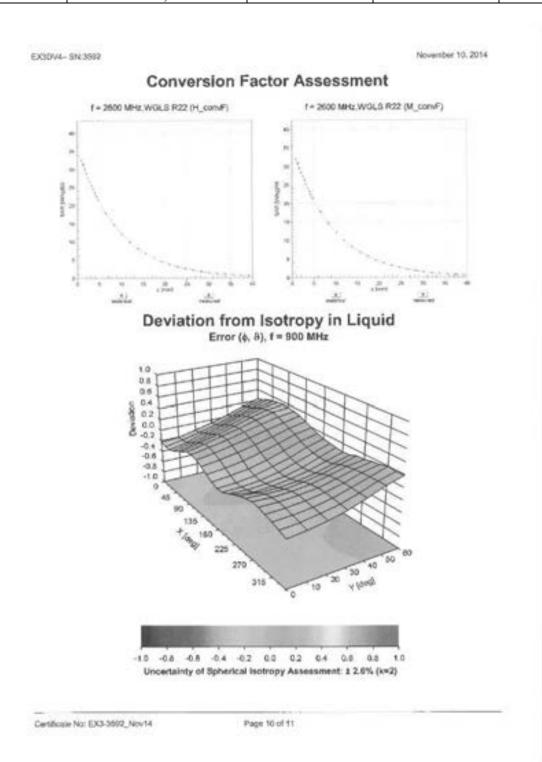
≅ BlackBerry	Appendix D for the BlackBerr Report Rev 2	Page 42(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		



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Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		



*** BlackBerry	Appendix D for the BlackBerr Report Rev 2	Page 44(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		



≅BlackBerry	Appendix D for the BlackBer Report Rev 2	Page 45(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

EXXXV4-SN:3592

November 10, 2014

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

Other Probe Parameters

Sensor Amangement	Triangular
Connector Angle (*)	-133
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	1.4 mm

Certificato No. EX3-3592_Nov14

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≅BlackBerry	Appendix D for the BlackBer Report Rev 2	Page 46(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

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





S Schweizerischer Kalibrierdienst Service seizee d'étalonnage C Servicio svizzero di taratura Swiss Calibration Service

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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

S

Certificate No. ET3-1644_Nov12

CALIBRATION CERTIFICATE Object ET3DV8 - SN:1644 QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure(x) Calibration procedure for dosimetric E-field probes November 13, 2012 Calibration date. This palitration pertilicate documents the traceability to national standards, which resilies the physical units of measurements (St). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 x 3)*C and humidity < 70% Calibration Equipment used (M&TE ontical for calibration)

Primary Standards	(D	Cali Date (Certificate No.)	Scheduled Calibration
Power meter E44198	G841299874	29-Mar-12 (No. 217-01508)	Apr.13
Power sensor E4412A	MY41406087	29-Mar-12 (No. 217-01906)	Age:13.
Raterence 3 dB Attenuator	SN: 55054 (3c)	27-Mar-12 (No. 217-0153/)	Apr.13
Reference 20 nB Attenuator	SN: 55006 (20b)	27-Mar-12 (No. 217-01528)	Agr-13
Reference 30 dB Attenuator	SN: 95129 (30k)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES30V2	SN: 3013	29-Dec-11 (No. ES3-3013, Dec11)	Dec-12
DAE4	SN: 600	20-Am 12 (No. DAE4-660, Am12)	Jun-13
Secondary Standards	10	Check Date (in house)	Scheduled Check
RF-generator HP 8648C	1253642UC1700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 87636	LIS37390585	18-Oct-01 (in house sheck Oct-12)	In house check: Oct-13

Calibrated by	Name Jeton Kastrali	Function Laboratory Technician	Signare F-U
Approved by:	Karja Pokovis	Technical Manager	De My
This calification certificate	shall not be renenduced except in fu	i without written approval of the laboratory	laused November 13, 2012

Certificate No. ET3-1644_Nov12

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≅BlackBerry	Appendix D for the BlackBerr Report Rev 2	Page 47 (139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Calibration Laboratory of Schmid & Partner Engineering AG Zenghausstonus 43, 8094 Zurich, Switzerland





S Schweizerischer Kalibriendenst C Service seisse d'étalonnage Servicie evizaere di taratura Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL tissue simulating liquid NORMx.y.z sensitivity in free space convF sensitivity in TSL / NORMx.y.z DCP diede compression point

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

Polarization o o rotation around probe axis

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

i.e., it = 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 Spetial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- iEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)". February 2006

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization a = 0 (f < 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
 NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E¹-field uncertainty inside TSL (see below CorwF).
- NORMITIX.y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is
 implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included
 in the stated uncertainty of Com/F.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax.y.z: Bx.y.z: Cx.y.z. VRx.y.z: A, 8. 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 same given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMs, y, z * 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 asstropy): in a field of low gradients realized using a flat phantom exposed by a patch aritenna.
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

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≅BlackBerry	Appendix D for the BlackBerr Report Rev 2	Page 48(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
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	December 10-12, 2014	Rev 3		

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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	December 10-12, 2014	Rev 3		

ET3DV6-SN:1644

November 13, 2012

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

Basic Calibration Parameters

	Sensor X		Sensor Z	Unc (k=2)
Norm (µ/V/(V/m) ²) ^A	1.71	1,97	1.98	± 10.1 %
DCP (m/V) [®]	99.5	98.7 97.5		-

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	68	C dB	WR mV	Unc (k+2)
ò	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 E²-field uncertainty inside YSL (see Pages 6 and 6).

Numerical invariant parameter, uncertainty not required.

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

≅BlackBerry	Appendix D for the BlackBer Report Rev 2	Page 50(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

ET30V6- 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	Com/F Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.57	6.57	6.57	0.44	2.25	± 12.0 %
900	41.5	0.97	6.24	6.24	6.24	0.38	2.52	± 12.0 %
1810	40.0	1.40	5.21	5.21	5,21	080	2.10	± 12.0 %
1950	40.0	1.40	5.16	5.16	5.16	08.0	2.09	± 12.0 %
2450	39.2	1.60	4.60	4.60	4.60	0.65	2.00	£ 12.0 %

¹ Frequency validity of a 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to a 50 MHz. The uncertainty is the RSS of the ConvE uncertainty at collisation frequency and the uncertainty for the indicated frequency band.
At lequencies below 3 GHz, the validity of tense parameters is and o) can be reliazed to a 10% if liquid conservation formula is applied to measured SAAF values. At frequencies above 3 GHz, the validity of tense parameters (ii and ii) is restricted to a 5%. The uncertainty is the RSSs of the ConvE uncertainty for indicated target fiscule parameters.

Certificate No: ET3-1644_Nov12

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≅BlackBerry	Appendix D for the BlackBer Report Rev 2	ry® Smartphone Mod	el RFL111LW SAR	Page 51(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

ET30V6-SN:1644

November 13, 2012

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

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^E	Relative Permittivity	Conductivity (S/m) ²	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.30	6.30	0.30	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%

Certificate No: ET3-1644_Nov12

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¹ Frequency validity of a 100 MHz only applies for DASY v4.4 and higher (see Page 2), else 8 is restricted to a 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at californizer frequency and the uncertainty for the indicated frequency band.
¹ At frequencies below 3 GHz, the validity of fiscus parameters (size of care be related to 2 GHz, the validity of fiscus parameters), and o) can be related to 2 GHz, the uncertainty is the RSS of the ConvF uncertainty for indicated larged titsue parameters.

≅BlackBerry	Appendix D for the BlackBerr Report Rev 2	y® Smartphone Mode	RFL111LW SAR	Page 52(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

ET30V6-SN:1644

November 13, 2012

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

1.5 Frequency response (normalized) 1.2-1.1 1.0 0.9 0.8 0.7 0.6 0.5 500 3000 1000 1500 2000 2500 f [MHz] TEM

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

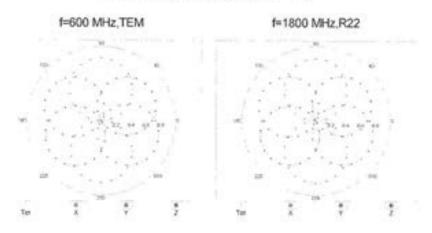
Certificate No: ET3-1644_Nov12

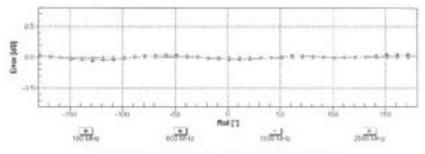
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≅BlackBerry	Appendix D for the BlackBer Report Rev 2	ry® Smartphone Mode	el RFL111LW SAR	Page 53(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

ET3DV6- 5N:1644 November 13, 2012

Receiving Pattern (6), 9 = 0°





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

Certificate No: ET3-1644_Nov12

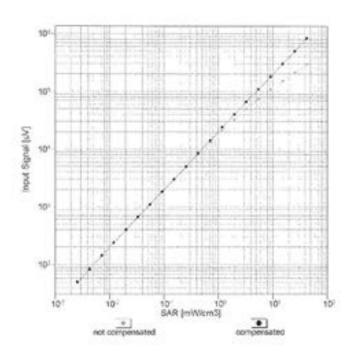
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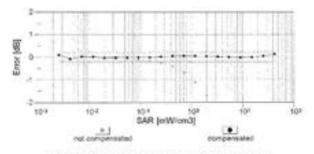
≅BlackBerry	Appendix D for the BlackBer Report Rev 2	rry® Smartphone Mod	el RFL111LW SAR	Page 54(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

ET30V6- SN:1644

November 13, 2012

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





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

Certificate No: ET3-1644, Nov12

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≅ BlackBerry	Appendix D for the BlackBer Report Rev 2	Page 55(139)		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

ET3DV6-SN:1644 November 13, 2012 Conversion Factor Assessment 1 = 1810 MHz, WGL5 R22 (H_convF) f = 900 MHz, WGLS R9 (H_comF) Deviation from Isotropy in Liquid Error (6, 8), f = 900 MHz 1.0 6.6 0.8 0.4 0.2 0.0 -0.2 -0.4 0.6 -0.6 -1.0 D 135 -10 -08 -08 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 1.0 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Appendix D for the BlackBerry Report Rev 2	Fage 56(139)		
Dates of Test	Test Report No	FCC ID:	IC
Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	Appendix D for the BlackBerr Report Rev 2	Appendix D for the BlackBerry® Smartphone Mode Report Rev 2 Dates of Test Nov 22 2012 – Feb 28 2013 Test Report No RTS-6026-1302-13	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2 Dates of Test Nov 22 2012 – Feb 28 2013 Test Report No RTS-6026-1302-13 FCC ID: L6ARFL110LW

ET3DV6- SN:1644

November 13, 2012

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

Other Probe Parameters

Triangular
61.5
enabled
ensitied
337 mm
10 mm
10 mm
6.8 mm
2.7 mm
2.7 mm
2.7 mm
4 mm

Certificate No: ET3-1644_Nov12

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≅BlackBerry	Appendix D for the BlackBer Report Rev 2	rry® Smartphone Mod	el RFL111LW SAR	Page 57 (139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

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





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Accredited by the Swiss Accreditation Service (SAS). The Swiss Accreditation Service is one of the size

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

Client RIN

Accreditation No.: SCS 108

Certificate No: D750V3-1021_Jan11

Object	D750V3 - SN: 10	21	
Calibration procedure(s)	QA CAL-05.v8 Calibration proce	dure for dipole validation kits	
		ME SAME	
Calibration date:	January 05, 2011	Losson and	
		ional standards, which realize the physical ur	
he measurements and the unce	risinties with confidence p	robability are given on the following pages ar	nd are part of the certificate.
NI calibrations have been condu	cled in the closed laborato	ry facility: environment temperature (22 a 3)*	C and humidity < 70%.
Calibration Equipment used (M&	TE critical for calibration)		
Yonary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Pomary Standards	ID # G837480704	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266)	Scheduled Calibration Oct-11
Yower meter EPM-442A		The state of the s	
Power meter EPM-442A Power sensor HP 8481A	G837480704 US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Power mater EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator	G837480704	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Main 10 (No. 217-01156)	Oct-11 Oct-11
Control of the Contro	G837480704 US37292763 SN: 5086 (20g)	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01156) 30-Mar-10 (No. 217-01162)	Oct-11 Oct-11 Mar-11
Power mater EPSA-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3	G837480704 US37292763 SN: 5086 (20g) SN: 5047.2 / 06327	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Main 10 (No. 217-01156)	Oct-11 Oct-11 Mar-11 Mar-11
Power mater EPIM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3CV3 DAE4	G837480704 US37292793 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01156) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE4-601_Jun10)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11
Power mater EPIM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N miamatch combination Reference Probe ES3CV3 DAE4 Secondary Standards	G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Main-10 (No. 217-01156) 30-Main-10 (No. 217-01162) 30-Apr-10 (No. ES3-3265, Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check
Power mater EPIM-442A Power sensor HP 8481A Reference 20 dB Attenuator type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A	G837480704 US37292783 SN: 5085 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01166) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. 633-3205, Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11
Power mater EPIM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N miamatch combination Reference Probe ES3CV3 DAE4 Secondary Standards	G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Main-10 (No. 217-01156) 30-Main-10 (No. 217-01162) 30-Apr-10 (No. ES3-3265, Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check
Power seasor HP 8481A Reference 20 dB Attenuator type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 54206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01156) 30-Mar-10 (No. 217-01156) 30-Apr-10 (No. 633-3205, Apr10) 10-Jun-10 (No. 633-3205, 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)	Oct-11 Oct-11 Mer-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11
Power mater EPIM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3CV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Withork Analyzer HP 8753E	G837480704 US37292783 SN: 5066 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 54206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01156) 30-Mar-10 (No. 217-01156) 30-Apr-10 (No. 633-3205, Apr10) 10-Jun-10 (No. 633-3205, Apr10) 10-Jun-10 (No. 633-3205, Apr10) 10-Jun-10 (No. 0464-601_Jun-10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 18-Oct-02 (in house check Oct-09) 18-Oct-01 (in house check Oct-10)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11
Power seasor HP 8481A Reference 20 dB Attenuator type N mamatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 54206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01156) 30-Mar-10 (No. 217-01156) 30-Apr-10 (No. 633-3205, Apr10) 10-Jun-10 (No. 633-3205, 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)	Oct-11 Oct-11 Mer-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11
Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8681A RF generator R&S SMT-06 Network Analyzer HP 8753E	G837480704 US37292783 SN: 5066 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 54206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01156) 30-Mar-10 (No. 217-01156) 30-Apr-10 (No. 633-3205, Apr10) 10-Jun-10 (No. 633-3205, Apr10) 10-Jun-10 (No. 633-3205, Apr10) 10-Jun-10 (No. 0464-601_Jun-10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 18-Oct-02 (in house check Oct-09) 18-Oct-01 (in house check Oct-10)	Oct-11 Oct-11 Mer-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11
Power mater EPIM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3CV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Withork Analyzer HP 8753E	G837480704 US37292783 SN: 5085 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 54206 Name Jeton Kastrati	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Main-10 (No. 217-01166) 30-Main-10 (No. 217-01162) 30-Apr-10 (No. E33-3205, 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) 18-Oct-01 (in house check Oct-10) Function Laboratory Technician	Oct-11 Oct-11 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
Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8681A RF generator R&S SMT-06 Network Analyzer HP 8753E	G837480704 US37292783 SN: 5085 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 54206 Name Jeton Kastrati	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Main-10 (No. 217-01166) 30-Main-10 (No. 217-01162) 30-Apr-10 (No. E33-3205, 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) 18-Oct-01 (in house check Oct-10) Function Laboratory Technician	Oct-11 Oct-11 Mer-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11

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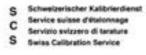
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	December 10-12, 2014	Rev 3		

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







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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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Measurement Conditions

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

DASY Version	DASY5	V52.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz n 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	423±6%	0.91 mho/m a 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	- Anna	

SAR result with Head TSL

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.12 mW / g
SAR normalized	normalized to 1W	8.48 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	8.36 mW /g ± 17.0 % (k=2)

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

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 ns
and the second s	7,400.10

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

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

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

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	December 01, 2010	

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

DASY5 Validation Report for Head TSL.

Date/Time: 05.01.2011 15:51:17

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL750

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

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6.37, 6.37, 6.37); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6 Build (401)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

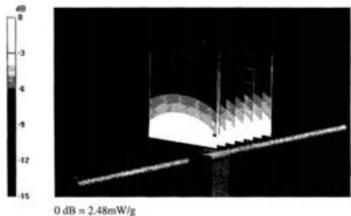
Pin=250mW; dip=15mm; dist=3.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

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

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

Peak SAR (extrapolated) = 3.24 W/kg

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



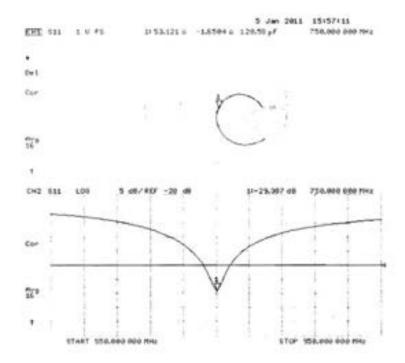
0 ub = 2.46mm

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Impedance Measurement Plot for Head TSL



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	December 10-12, 2014	Rev 3		

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





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

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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D750V3-1021 Jan13 CALIBRATION CERTIFICATE Object D750V3 - SN: 1021 Calibration procedure(x) QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz Calibration date: January 07, 2013 This calibration certificate documents the traceability to national standards, which reside the physical units of measurements (St). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 s 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration) Primary Standards ID# Cal Date (Certificate No.) Scheduled Calibration Power meter EPM-442A G837480704 01-Nov-12 (No. 217-01640) Power sensor HP 8481A US37292763 01-Nov-12 (No. 217-01640) Oct-13 Reference 20 dB Attenuator SN: 5058 (20k) 27-Mar-12 (No. 217-01530) Apr-13 Type-N mismatch combination SN: 5047.3 / 06327 27-Mar-12 (No. 217-01530) Apr-13 Reference Probe ESSOV3 SN: 3205 28-Dec-12 (No. ESS-3205_Dec12) Dec-13 DAE4 SN: 601 27-Jun-12 (No. DAE4-601, Jun12) Jun-13 ID # Check Date (in house) Scheduled Check Secondary Standards Power sensor HP 8481A MY41092317 18-Oct-07 (in house check Oct-11) In house check: Oct-13 RF generator RAS SMT-00 100005 04-Aug-99 (in house check Cct-11) In house check: Oct-13 Network Analyzer HP 6753E. US37300585 S4206 18-Oct-01 (in house check Oct-12) In house check: Oct-13 Function Signature Calibrated by: Leif Klysner Laboratory Technician Kata Pokovac Technical Manager Approved by: Issued: January 8, 2013 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Calibration Laboratory of

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





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

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL

tissue simulating liquid

ConvF 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 Rediofrequency 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%.

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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Measurement Conditions

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

DASY Version	DASY5	V52.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.4±6%	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	****	

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.46 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ² (10 g) of Head TSL	condition	
SAR measured	250 mW Input power	1.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.51 W/kg ± 16.5 % (k=2)

Certificate No: D750V3-1021_Jan13

*** BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 66(139)
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	December 10-12, 2014	Rev 3		

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.7 G - 0.2 JO	
Return Loss	- 25.4 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1,033 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 01, 2010

Certificate No: D750V3-1021_Jan13

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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

DASY5 Validation Report for Head TSL

Date: 07.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 750 MHz

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

Phantom section: Flat Section

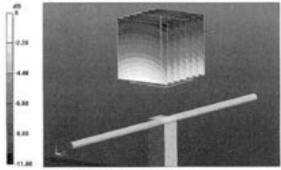
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6.28, 6.28, 6.28); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

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

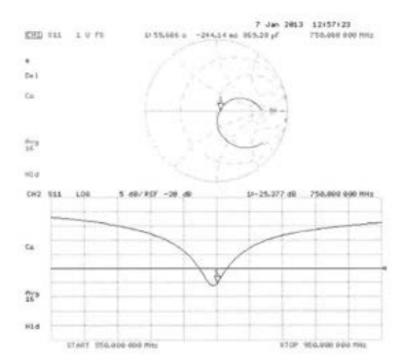
Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 54.107 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.23 W/kg SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.38 W/kg Maximum value of SAR (measured) = 2.47 W/kg



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

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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Impedance Measurement Plot for Head TSL



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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

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





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Clent RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D635V2-446_Jan11

Dteect	D835V2 - SN: 44	6	
Calibration procedure(s)	QA CAL-05.v8		
	Calibration proce	dure for dipole validation kits	
Calibration data:	January 21, 2011	COLUMN SECTION	
		onal standards, which realize the physical o	
he measurements and the unce	rtainties with confidence p	robability are given on the following pages i	and are part of the certificate.
El calibrations have been condu	that in the closest laborator	ry facility: environment temperature (22 s 3)	/C and humidity a 70%
or a second control of the control o) may 1 may 1 m 2 m 3 m 3 m 3 m 3 m 3 m	daming and
Calibration Equipment used (M&1	TE critical for calibration)		
Primary Standards	10 #	Cal Date (Certificate No.)	Scheduled Calibration
	ID # G837480704	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266)	Scheduled Calibration Qct-11
Power meter EPM-442A Power sensor HP 8481A	The second secon		
Power meter EPM-442A Power sensor HP 8481A	G837480704	06-Oct-10 (No. 217-01266)	Oct-11
Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator	G837480704 US37292783	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266)	Oct-11 Oct-11
Power meter EPM-442A Power sensor HP 8481A Telerence 20 dB Attenuator Type-N mismatch combination	G837480704 US37292783 SN: 5086 (20g)	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158)	Oct-11 Oct-11 Mar-11
Power meler EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3OV3	G837480704 US37282783 SN: 5086 (20g) SN: 5047.2 / 06327	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162)	Oct-11 Oct-11 Mar-11 Mar-11
Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards	G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3055 SN: 601	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10)	Oci-11 Oci-11 Mar-11 Mar-11 Apr-11
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	G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE-601_Jun10) Check Date (in house)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Bichoduled Check
Power meter EPM-442A Power sensor HP 8481A Interence 20 dB Attenuator type-N mamarch combination Interence Probe ES3DV3 JAE4 Secondary Standards Power sensor HP 8481A IF generator HB SAMT-06	G837480704 US37292783 SN: 5086 (20g) SN: 5087.2 / 08327 SN: 3205 SN: 601 IQ # MY41092317 100005	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE(4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Schoduled Check In house check: Oct-11 In house check: Oct-11
Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type N mamarch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	G837480704 US37282783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601 IO 4 MY41092317	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE-601_Jun10) Check Date (in house)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Schoduled Check In house check: Oct-11 In house check: Oct-11
Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type N mamarch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	G837480704 US37292783 SN: 5066 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601 ID # MY41092317 100005 US37380585 S4206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01158) 30-Apr-10 (No. E33-3205_Apr10) 10-Jun-10 (No. DAE-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 6-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-09)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Schoduled Check In house check: Oct-11 In house check: Oct-11
Power meter EPM-442A Power sensor HP 8481A Interence 20 dB Attenuator pp-N mismatch combination laterence Probe ES3DV3 IAE4 Recondary Standards Power sensor HP 8481A IF generator R&S SMT-06 Notwork Analyzer HP 8753E	G837480704 US37282783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601 ID # MY41092317 100005 US37380585 S4206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. E53-3205_Apr10) 10-Jun-10 (No. DAE-601_Jun10) Check Oate (in house check Oct-09) 6-Aug-99 (in house check Oct-08) 18-Oct-01 (in house check Oct-08) 18-Oct-01 (in house check Oct-08)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Schoduled Check In house check: Oct-11 In house check: Oct-11
Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards	G837480704 US37292783 SN: 5066 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601 ID # MY41092317 100005 US37380585 S4206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01158) 30-Apr-10 (No. E33-3205_Apr10) 10-Jun-10 (No. DAE-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 6-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-09)	Oci-11 Oci-11 Mar-11 Mar-11 Apr-11 Jun-11
Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Notwork Analyzer HP 8753E	G837480704 US37282783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601 ID # MY41092317 100005 US37380585 S4206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. E53-3205_Apr10) 10-Jun-10 (No. DAE-601_Jun10) Check Oate (in house check Oct-09) 6-Aug-99 (in house check Oct-08) 18-Oct-01 (in house check Oct-08) 18-Oct-01 (in house check Oct-08)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Schoduled Check In house check: Oct-11 In house check: Oct-11
Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type A Immanach combination Reterence Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Notwork Analyzer HP 8753E Calibrated by:	G837480704 US37282783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601 IO a MY41092317 100005 US37380585 S4206 Name Dence Rey	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE-601_Jun10) Check Date (in house check Oct-09) 6-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-09) 18-Oct-01 (in house check Oct-09) Function Laboratory Technician	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Schoduled Check In house check: Oct-11 In house check: Oct-11

Certificate No: D835V2-446_Jan11

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	December 10-12, 2014	Rev 3		

Calibration Laboratory of

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





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

Accreditation No.: SCS 108

Accredited by the Swes Accreditation Service (SAS)

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Glossary:

TSL ConvF tissue simulating liquid

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

ConvF sensitivity N/A not applic

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.

	1 1000	
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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Measurement Conditions

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

DASYS	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		-

SAR result with Head TSL

SAR averaged over 1 cm ³ (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 x 17.0 % (k=2)

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

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.6 \(\Omega = 7.7 \)
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

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

DASY5 Validation Report for Head TSL

Date/Time: 21.01.2011 10:18:05

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL900

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

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601: Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

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

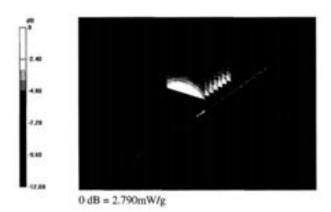
grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 3.600 W/kg.

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

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

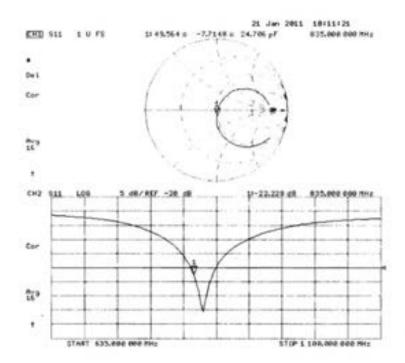


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	December 10-12, 2014	Rev 3		

Impedance Measurement Plot for Head TSL



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





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

Accreditation No.: SCS 108

10000 - 4000

Client RTS (RIM Testing Services)

Certificate No: D835V2-446_Jan13

		A STATE OF THE STA	
Strject	D835V2 - SN: 44	6	
Calibration procedure(s)	QA CAL-05.v9		(항상) (강성) (변경)
	Calibration proce	dure for dipole validation kits abo	we 700 MHz
albration date:	January 07, 2013	Leading to a short the	
		ional standards, which realize the physical un	
he measurements and the unce	stainties with confidence p	robability are given on the following pages an	od are part of the certificate.
I calibrations have been conduc	cted in the closed laborator	ry facility: environment temperature (22 \pm 3)°C	C and humidity < 70%.
albration Equipment used (M&)	TE critical for calibrations		
	TE critical for calibrations	Cal Date (Certificate No.)	Scheduled Calibration
rimary Standards	() (20일이 (20일이 1995) () - (19일이 (20일이 1995) ()	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640)	Scheduled Calibration Oct-13
rimary Standards ower meter EPM-442A	101		
imary Standards over meter EPM-442A over sensor HP 8481A	8D # GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
ower meter EPM-442A ower sendor HP 8481A eference 20 dB Attenuator	ED # GB37460704 US37296783	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Oct-13 Oct-13
omary Standards over meter EPM-442A over sendor HP 8481A oference 20 dB Attenuator ype N mismatch combination	ED # GB37480704 US37292783 SN: 5058 (20k)	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630)	Oct-13 Oct-13 Apr-13
timary Standards over mater EPM-442A over sendor HP 4481A eference 20 dB Atenuator yoe'N mismatch combination oference Probe ES30V3	8D # 0837480704 US37292783 5N: 5058 (20k) SN: 5047.3 / 08387	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630)	Oct-13 Oct-13 Apr-13 Apr-13
timary Standards ower meter EPM-442A ower sendor HP 8481A service 20 dB Abrouator yee-N mismatch combination telerance Probe ES3CV3 AE4	ID # GB37480704 US37292783 SN: 5058 (204) SN: 5057.3 / 06327 SN: 3005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13
alibration Equipment used (MA: formary Standards fower meter EPM-442A fower sendor HP 8481A laterance 20 dB Attenuator type N miseratich combination foliasinos Probe ESSDV3 ME4 econdary Standards fower sensor HP 8481A	ID # GB37480704 US37292783 SN: 5058 (20a) SN: 5047.3 / 06327 SN: 3006 SN: 601	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01536) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-801, Jun12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13
timary Standards tower meter EPM-442A tower sensor HP 8481A selection 20 dB Attenuator type N mismatch combination tolerance Probe ES3OV3 AE4 econdary Standards tower sensor HP 8481A	ID # GB37480704 US37292783 SN: 5068 (20A) SN: 5047.3 / 08327 SN: 3006 SN: 601	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Junt2) Check Oate (in house)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check
nimary Standards Tower meter EPM-442A Tower sensor HP 8481A Selection 20 dB Attenuator yle N mismatch combination following Probe ESGOV3 AAE4 Secondary Standards	ID # GB37480704 US37292783 SN: 5047.3 / 06927 SN: 3006 SN: 601 ID # MY41092317	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01633) 28-Dec-12 (No. ES3-3295, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (In house) 18-Oct-02 (in house check Oct-11)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
timary Standards ower meter EPM-442A ower sendor HP 8481A eference 20 dB Attenuator ype N miserialish combination tolerance Probe ES3CV3 AE4 econdary Standards ower sensor HP 8481A E generator RSS SAIT-06	ID # GB37480704 US37292783 SN: 5068 (20h) SN: 5047.3 / 06327 SN: 3006 SN: 601 ID # MY41092317 100005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. ES3-3295, Dec12) 27-Jun-12 (No. DAE4-801, Jun12) Check Date (in house) 19-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11)	Oct-13 Oct-13 Apr-13 Apr-13 Disc-13 Jun-13 Scheduled Check In fouse check: Oct-13 In house check: Oct-13
timary Standards tower meter EPM-442A cover sentor HP 8481A over sentor HP 8481A over sentor HP 8481A over sentor HP 8481A econdary Standards over sentor HP 8481A F generator R&S SAT-00 ettwork Analyzer HP 8753E	ID # GB37480704 UB37292783 5N: 5087.3 / 06327 SN: 5047.3 / 06327 SN: 601 ID # MY41092317 100005 US3729058S 54206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01536) 27-Mar-12 (No. ES3-3205, Dec12) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 18-Oct-01 (in house check Oct-11) 06-Aug-99 (in house check Oct-12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In fouse check: Oct-13 In house check: Oct-13 In house check: Oct-13
nimary Standards Tower meter EPM-442A Tower sendor HP 8481A Inference 20 dB Attenuator type N miseratch combination tolerance Probe ES3DV3 MAE4 Recondary Standards Tower sensor HP 8481A Ef generator R&S SAET-06	ID # GB37460704 US37292783 5N: 5082 (20k) SN: 5047.3 / 06327 SN: 3006 SN: 601 ID # MY41092317 100005 US37290588 54206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 18-Oct-01 (in house check Oct-11) 18-Oct-01 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In fouse check: Oct-13 In house check: Oct-13 In house check: Oct-13

Certificate No: D835V2-446_Jan13

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	December 10-12, 2014	Rev 3		

Calibration Laboratory of Schmid & Partner

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





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C Service suisse d'étalennage
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S Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Series 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.

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

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Measurement Conditions

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

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

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

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

SAR averaged over 10 cm ² (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)

Gertificate No: D835V2-446_Jan13

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.1 Ω − 6.5 jΩ	- 1
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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	December 10-12, 2014	Rev 3		

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

Phantom section: Flat Section

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

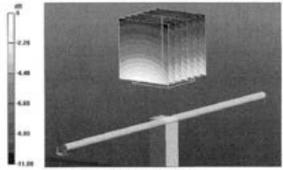
DASY52 Configuration:

- 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

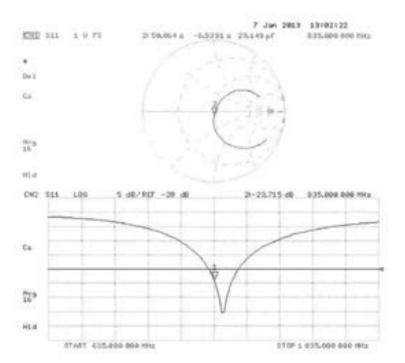
Maximum value of SAR (measured) = 2.79 W/kg



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

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Impedance Measurement Plot for Head TSL



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





S Schweizertecher Kellbrierdienet
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Multitateral Agreement for the recognition of cellbration certificates

Client RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D835V2-4d043_Apr11

Dipact	D835V2 - SN: 4d	043	
Califration proundure(s)	QA CAL-05.v8 Calibration proce	dure for dipole validation kits	
Calibration date:	April 07, 2011		
		onal standards, when resilize the shysical un robability are given on the following pages at	
M cultinations have been condu	cted in the skeed laborato	ry laciny, environment temperature (22 e 3) ¹	C and burnidity < 70%
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alibration Equipment used (MI) himany Standards Ower motor EPM-442A	TE ordical for calibrations	Os Dive (Conflictle No.)	Schoduled Calibration
Talibration Equipment used (NA) hymery Standards Newer motor EPIM-442A Newer sonsor HP 5481A Neterance 20 dB Attenuator	TE ortical for calibration (i.g. # 0.827468704 US37292783 SN: 5086 (20g)	Cis Dive (Conficely No.) 06-Oct-10 (No. 217-01260) 06-Oct-10 (No. 217-01260) 29-Mar-11 (No. 217-01260)	Schoduled Calibration Oct-11 Opt-11 Apr-12
Calibration Equipment used (NA) Thinlery Standards Ower motor EPM-442A Theoremotor HP 8481A Tolerance 20 dB Attenuator Type N mismetion combination	TE ortical for calibration) (D # CR27460704 US37292763 SN 5066 (20g) SN 5047 2 / 66327	Cis Date (Conficate NA.) 05-Oct-10 (No. 217-01260) 06-Oct-10 (No. 217-01260) 29-Mar-11 (No. 217-01360) 29-Mar-11 (No. 217-01371)	Schoduled Calibration Oct-11 Oct-11 Apr-12 Apr-12
Calibration Equipment used (MA) Thinlery Standards Nover motor EPM-642A Power sonsor HP StatiA Molerance 2 dB Attenuator Type N resmetten combination Milerance Prote ESSOV3	TE ortical for calibration (i.g. # 0.827468704 US37292783 SN: 5086 (20g)	Cis Dive (Conficely No.) 06-Oct-10 (No. 217-01260) 06-Oct-10 (No. 217-01260) 29-Mar-11 (No. 217-01260)	Schoduled Calibration Oct-11 Opt-11 Apr-12
Calibration Equicinent used (NAS Primery Standards Primer motor SPM-442A Primer sonace 90 BB11A Pelerance 90 dB Attenuator Type N resemble combination Policemon Probe ESSOVO DAE4	TE official for calibration) ID # D82/469704 US37292783 SN 5086 (20g) SN 5047 2 / 66327 SN 601	Cis Divie (Conficate Nn.) 96-Oct-10 (No. 217-01098) 96-Oct-10 (No. 217-01098) 29-Mar-11 (No. 217-01099) 29-Mar-11 (No. 217-01071) 30-Apr-10 (No. 255-3205, Apr-10) 10-Jun-10 (No. 2AE 4-601, Jun-10)	Schoduled Collegation Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11
Calibration Equipment used (NAS Primary Standards Power motor SPM-442A Power sonsor HP StatiA Polerance 20 dB Attenuator Type N Proteston continuation Polerance Prote ESSDV3 SAE4 Secondary Standards	TE ortical for calibrations (0.9 OR37466704 US37292783 SN 5065 (20g) SN 5047 2 / 66027 EN 3005 SN 601	Cis Dive (Conficely No.) 06-Out-10 (No. 217-01296) 06-Out-10 (No. 217-01296) 29-Mar-11 (No. 217-01296) 29-Mar-11 (No. 217-01271) 30-Apr-10 (No. 282-4-601_Apr-10) 10-Jun-10 (No. 282-4-601_Apr-10) Check Date (in house)	Schoduled Calibration Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jan-11 Scheduled Check
Calibration Equipment used (NA) Timery Standards Timery Standards Timer sonor SPM-442A Timer sonor PP 8481A Timerson PS 8481A Timerson Pinter ES3DV3 SAE4 Focundary Standards Timer Sensor PP 8481A	TE official for calibration) ID # D82/469704 US37292783 SN 5086 (20g) SN 5047 2 / 66327 SN 601	Cis Dave (Conficely NA); 06-Oct-10 (No. 217-01296); 06-Oct-10 (No. 217-01296); 29-Mar-11 (No. 217-0139); 29-Mar-11 (No. 217-01371); 30-Apr-10 (No. 253-3295, Apr-10); 10-Jun-10 (No. 245-4901, Junit); Check Dark (in house);	Schoduled Cellination Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11 Scheduled Check In house check: Oct-11
Calibration Equipment used (NA) Primary Standards Power motor SPM-442A Power sonsor HP StattA Reference 20 dB Attenuator Type N Historiation contamination Polisrance Printe ESSOV3	TE critical for cultivacoro 10 # 0837466704 U637292763 SN 3066 (20g) SN 5047 2 / 66327 SN 3055 SN 601 10 # MY41082217	Cis Dive (Conficely No.) 06-Out-10 (No. 217-01296) 06-Out-10 (No. 217-01296) 29-Mar-11 (No. 217-01296) 29-Mar-11 (No. 217-01271) 30-Apr-10 (No. 282-4-601_Apr-10) 10-Jun-10 (No. 282-4-601_Apr-10) Check Date (in house)	Schoduled Calibration Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jan-11 Scheduled Check
Calibration Equipment used (NA) Primary Standards Power motor SPM-442A Power sonsor NP 8481A Polerance 20 dB Attenuator Type N mismetich contanation Polerance Probe ESSDV3 DAE4 Secondary Standards Power sensor PP 8481A RF generator PB 858M1-06	TE ortical for calibration) ID # ID82/466704 U63/2982783 SN 3086 (20g) SN 3047 2 / 96327 SN 305 SN 601 ID # MY41082317 100005 US3/7390588 54206	Ciri Dane (Contricute Nn.) 06-Oct-10 (No. 217-01056) 06-Oct-10 (No. 217-01056) 29-Mar-11 (No. 217-01056) 29-Mar-11 (No. 217-01059) 29-Mar-11 (No. 253-0205, Apr10) 10-Jun-10 (No. DAS 4-601, Jun 10) Check Dane (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)	Schoduland Calibration Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11 Scheduland Check In house check: Oct-11 In house check: Oct-11
Tallerston Equipment used (NAS) Timery Standards Tower somer EPM-442A Tower somer HP 5481A Tower somer HP 5481A Tower somer PR 5481A Tower somer PR 5481A Tower sensor PR 5481A Tower sensor PP 6481A Tower sensor PR 6481A	TE ortical for calibration	Cis Dave (Conficely No.) 06-Oct-10 (No. 217-01296) 06-Oct-10 (No. 217-01296) 29-Mar-11 (No. 217-01321) 30-Apr-10 (No. 253-3205, Apr-10) 10-Jun-10 (No. 262-4-601, Jun 10) Check Dare (in house) 18-Oct-32 (in house check Oct-39) 4-Aug-99 (in house theck Oct-09) 18-Oct-01 (in house theck Oct-10)	Schoduland Calibration Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11 Scheduland Check In house check: Oct-11 In house check: Oct-11
Calibration Equipment used (NA) Primary Standards Power motor SPM-442A Power sonsor NP 8481A Polerance 20 dB Attenuator Type N mismetich contanation Polerance Probe ESSDV3 DAE4 Secondary Standards Power sensor PP 8481A RF generator PB 858M1-06	TE ortical for calibration) ID # ID82/466704 U63/2982783 SN 3086 (20g) SN 3047 2 / 96327 SN 305 SN 601 ID # MY41082317 100005 US3/7390588 54206	Ciri Dane (Contricute Nn.) 06-Oct-10 (No. 217-01056) 06-Oct-10 (No. 217-01056) 29-Mar-11 (No. 217-01056) 29-Mar-11 (No. 217-01059) 29-Mar-11 (No. 253-0205, Apr10) 10-Jun-10 (No. DAS 4-601, Jun 10) Check Dane (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)	Schoduland Calibration Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11 Scheduland Check In house check: Oct-11 In house check: Oct-11

Certificate No: D835V2 4d043_Apr11

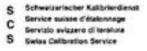
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	December 10-12, 2014	Rev 3		

Calibration Laboratory of Schmid & Partner Engineering AG Zeughsussisses 41, 6004 Zurich, Switzerland







Accreditation No.: SCS 108

Accredited by the Seins Accreditation Service (SAS).

The Series Accreditation Service is one of the signatories to the EA.

Multistensi Agreement for the recognition of calibration certification.

Glossary:

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

Calibration is Performed According to the Following Standards:

- 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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	December 10-12, 2014	Rev 3		

Measurement Conditions

DASY Version	DASYS	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz a 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		1004

SAR result with Head TSL

SAR averaged over 1 cm ² (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 TW	9.43 mW/g x 17.0 % (k=2)

SAR averaged over 10 cm ² (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 normal Head TSL parameters	normalized to 1W	6.14 mW /g ± 16.5 % (k=2)

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 (2 - 3.4 j(2	
Return Loss	-27.2 dB	

General Antenna Parameters and Design

Electri	cal Delay (one direction)	1 391 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The 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

Design Modification by End User

The dipole has been modified with Teton 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

feedpoint may be damaged.

Manufactured by	SPEAG
Manufactured on	April 07, 2006

Certificate No: D836V2-4d043_April 1

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	December 10-12, 2014	Rev 3		

DASY5 Validation Report for Head TSL

Date/Time: 07.04.2011 09:28:21

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL900

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

Phantom section: Flat Section

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

DASY5 Configuration:

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

· Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 10.06.2010

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

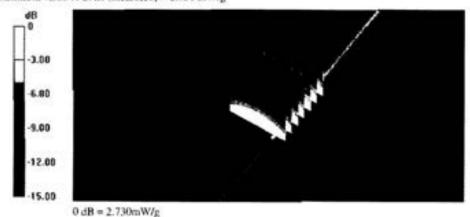
Measurement SW: DASY52, V52.6.2 Build (424)

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

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

Measurement grid: dx=Smm, dy=5mm, dz=5mm Reference Value = 57.201 V/mc 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

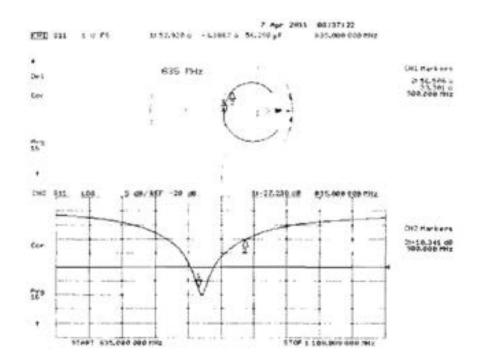


Certificate No: D835V2-4d043_Apr11

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	2503A-RFL110LW		

Impedance Measurement Plot for Head TSL



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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	2503A-RFL110LW		

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





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Multilateral Agreement for the recognition of calibration certificates

Client RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1800V2-2d020 Jan11

Otsject	D1800V2 - SN: 2	4020	
Calibration procedure(s)	QA CAL-05.v8 Calibration proce	dure for dipole validation kits	
Calibration date:	January 13, 2011	To North Selection	Walle of
		onal standards, which realize the physical orobolity are given on the following pages	
All calibrations have been conduc	sted in the closed laborator	ry facility: environment temperature (22 x 3)	°C and humidity < 70%.
Calibration Equipment used (M&)	TE critical for calibration)		
	TE critical for calibration)	Cal Date (Certificate No.)	Scheduled Calibration
himary Standards		Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266)	Scheduled Calibration Oct-11
Primary Standards Power meter EPM-442A	10#	The Contract of the Contract o	The second secon
Primary Standards Power meter EPM-442A Power sensor HP 8481A	ID # GIB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator	ID # G837480704 U537292783	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266)	Oct-11 Oct-11
Previery Standards Power meter EPM-642A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismistich combination	(D # GB37480704 U537292783 SN: 5086 (20g)	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158)	Oct-11 Oct-11 Mar-11
Primary Standards Power mater EPM-442A Power sensor HP 8481A Reference 039 Attenuator Type-N mismatch containation Reference Probe ES3DV3	ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162)	Oct-11 Oct-11 Mar-11 Mar-11
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Afterwator Type-N mismatch combination Reference Probe ES3CV3 DAE4	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205, Apr-10)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 d0 Attenuator Type-N mismatch containation Reference Probe ES3DV3 DAE4 Secondary Standards	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01158) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. OAE4-601_Jun10)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 d0 Attenuator Type-N mismatch combination teforance Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A	ID # GB37480704 US37292783 SN: 5066 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE4-601, Jun10) Check Date (in house)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N misseatch conteination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator PAS SMT-06	ID # GB37480704 US37292783 SN: 5066 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE-4-601, Jun10) Check Date (in house)	Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N misseatch conteination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator PAS SMT-06	ID # GB37480704 US37292783 SN: 5066 (20g) SN: 5047 2 / D6327 SN: 3205 SN: 601 ID # MY41092317 100005	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE-4601 Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09)	Oct-11 Oct-11 Man-11 Man-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11
Premary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 GB Afterwator Type-M mismatch combination Reference Probe ESSOV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Natwork Analyzer HP 8753E	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 54206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01158) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE-4-601_Jun10) Check Oate (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-02 (in house check Oct-09) 18-Oct-02 (in house check Oct-09) 18-Oct-01 (in house check Oct-10)	Oct-11 Oct-11 Man-11 Man-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 d0 Afterwator Type-N mismatch combination Reference Probe ES3CV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Natwork Analyzer HP 8753E	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047-2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 54206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01158) 30-Apr-10 (No. 217-01152) 30-Apr-10 (No. 253-3205, Apr10) 10-Jun-10 (No. OAE-4-601_Jun10) Check Oate (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10)	Oct-11 Oct-11 Man-11 Man-11 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&T Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dD Athenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator P&5 SMT-06 National Analyzer HP 8753E Calibrated by: Approved by:	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 54206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01158) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE-4-601_Jun10) Check Oate (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-02 (in house check Oct-09) 18-Oct-02 (in house check Oct-09) 18-Oct-01 (in house check Oct-10)	Oct-11 Oct-11 Man-11 Man-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11

Certificate No: D1800V2-2d020_Jan11

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Andrew Becker	Nov 22 2012 – Feb 28 2013	2503A-RFL110LW		
	December 10-12, 2014	Rev 3		

Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS):

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

Glossary:

TSL ConvF

N/A

tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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Andrew Becker	Nov 22 2012 – Feb 28 2013	2503A-RFL110LW		
	December 10-12, 2014	Rev 3		

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	1800 MHz = 1 MHz	

Head TSL parameters
The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	25.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.6 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature during test	(21.3 ± 0.2) °C		

SAR result with Head TSL

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.78 mW / g
SAR normalized	normalized to 1W	39.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	39.2 mW/g ± 17.0 % (k=2)

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

Certificate No: D1800V2-2d020_Jan11

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Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.5 Ω - 7.3 jΩ
Return Loss	- 21.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.216 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 07, 2001

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

DASY5 Validation Report for Head TSL

Date/Time: 13.01.2011 12:34:12

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL U12 BB

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

Phantom section: Flat Section

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

DASY5 Configuration:

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

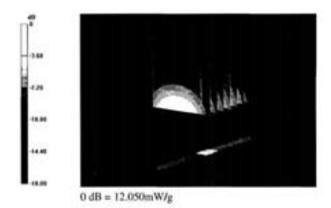
Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement

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

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

Peak SAR (extrapolated) = 17.902 W/kg

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

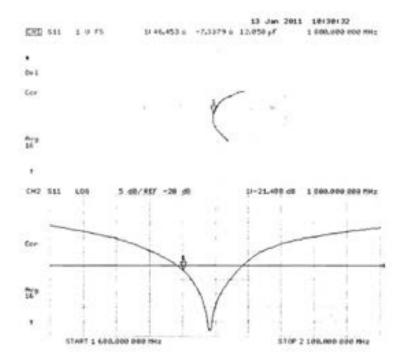


Certificate No: D1800V2-2d020_Jan11

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Impedance Measurement Plot for Head TSL



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	December 10-12, 2014	Rev 3		

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





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RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1800V2-2d020_Jan13 CALIBRATION CERTIFICATE Cityout D1800V2 - SN: 2d020 Calibration procedure(s) QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz Calibration date: January 09, 2013 This calibration conflicate documents the traceability to national standards, which realize the physical units of measurements (Str. The measurements and the uncertainties with confidence probability are given on the following pages and are part of the contribute. All calibrations have been conducted in the closed laboratory facility, environment temperature (52 a 3)°C and humidity < 70%. Celibration Equipment used (M&TE ontool for calibration) 100 Primary Standards Cal Date (Certificate No.) Scheduled Calibration Power meter EPM-442A GB37480704 01-Nov-12 (No. 217-01640) Oct-13 Power sensor HP 8481A US37292783 01-Nov-12 (No. 217-01640) 065-13 Reference 20 dB Attenuator SN: 5058 (20k) 27-Mar-12 (No. 217-01530) Apr-13 Type-N mismatch combination SN: 5047.3 / 06307 27-Mar-12 (No. 217-01533) Apr-13 SN: 3205 Reference Probe ES3DV3 26-Dec-12 (No. ES3-3205, Dec12) Dec-13 DAE4 SN: 601 27-Jun-12 (No. DAE4-601, Jun12) Secondary Standards 10 # Check Date (in house) Scheduled Check Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 In house check: Oct-13 RF generator R&S SMT-06 100006 54-Aug-99 (in house check Oct-11) Nativork Analyzer HP 8750E US37300585 S4206 18-Oct-01 (in house check Oct-12) In house check: Oct-13 Calibrated by: Laboratory Technician Approved by: tiqued: January 9, 2013 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: D1800V2-2d020_Jan13

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Calibration Laboratory of Schmid & Partner Engineering AG

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweiserischer Kallbrierdienst
C Service suisse d'étalonnage
Servicio svizzoro 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Certificate No: D1800V2-2d020_Jan13

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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Measurement Conditions

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

DASY Version	DASY5	V52.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz a 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 mha/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.61 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	38.5 W/kg ± 17.0 % (k×2)

SAR averaged over 10 cm ² (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.3 W/kg ± 16.5 % (k=2)

≅ BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 96(139)
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.2 (1 - 6.3)(1	
Return Loss	- 20.5 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.216 rs

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

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

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	September 07, 2001	

Certificate No: D1800V2-2d020_Jan13

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	December 10-12, 2014	Rev 3		

DASY5 Validation Report for Head TSL

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1800 MHz

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

Phantom section: Flat Section

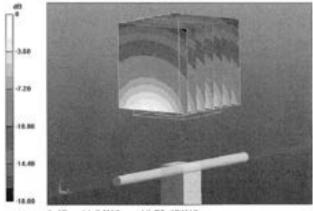
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(5.04, 5.04, 5.04); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06:2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

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

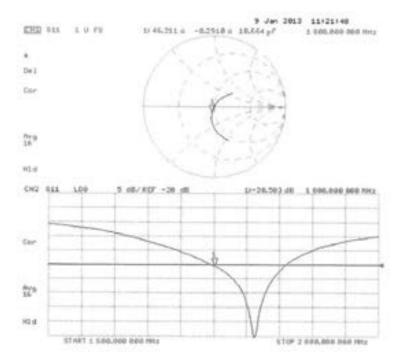
Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 95.870 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 17.5 W/kg SAR(1 g) = 9.61 W/kg; SAR(10 g) = 5.06 W/kg Maximum value of SAR (measured) = 11.8 W/kg



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

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Impedance Measurement Plot for Head TSL



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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

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





S Schweizerischer Kalibrierdienst C Service suisse d'étalonnage Servialo 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

Multilisteral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client RTS (RIM Testing Services)

Certificate No: D1900V2-545_Jan11

Diject	D1900V2 - SN: 5	45 CONTRACT A CONTRACTOR	Anti-L. Tables
Calibration procedure(s)	QA CAL-05.v8 Calibration proce	dure for dipole validation kits	A
		Maria Comment of the San Comment	and the second
Calibration date:	January 13, 2011		G00 613
		onal standards, which realize the physical un robability are given on the following pages ar	
If calibrations have been condu	oted in the closed laborator	ry facility: environment temperature (22 x 3)*	C and humidity < 70%.
Calibration Equipment used (M&	TE ortical for calibration)		
	TE ortical for calibration).	Cal Date (Certificate No.)	Scheduled Calibration
imary Standards		Cal Date (Certificate No.) 06-Out-10 (No. 217-01266)	Scheduled Calibration Oct-11
imary Standards ower meter EPM-442A	0.	- Control - Cont	
imary Standards ower meter EPM-442A ower sensor HP 8481A	ID # GB37480704 US37292783 SN: 5086 (20g)	06-Oct-10 (No. 217-01266)	Oct-11
imary Standards ower meter EPM-442A ower sensor HP 8481A eference 20 dB Atlenuator ipe-N miomatch combination	ID # GB37480704 US37292783	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266)	Oct-11 Oct-15
imary Standards over moter EPM-442A over sensor HP 8481A riference 20 dB Attenuator ge-N miornatch combination	ID # GB37480704 US37292783 SN: 5086 (20g)	06-Out-10 (No. 217-01266) 06-Out-10 (No. 217-01266) 30-Mar-10 (No. 217-01156)	Oct-11 Oct-11 Mar-11
imary Standards over moter EPM-442A over sensor HP 8481A eference 20 dB Attenuator spe-N mismatch combination aference Prible ES30V3	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327	06-Out-10 (No. 217-01266) 06-Out-10 (No. 217-01266) 30-Mar-10 (No. 217-01156) 30-Mar-10 (No. 217-01162)	Oct-11 Oct-15 Mar-15 Mar-11
ower meter EPM-442A ower service HP 8481A elemence 20 dB Abenuator yoe-N miomatch combination oference Probe ES3OV3 AE4	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01156) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205, April0)	Och 11 Och 15 Mar-15 Mar-11 Apr-11
ower meter EPM-442A ower sensor HP 8451A eference 20 dB Attenuator yee-N microalch combination laferance Price ES30V3 AE4 econdary Standards	ID # GB37480704 US37292783 SN: 5086 (205) SN: 5047 2 / 06327 SN: 3005 SN: 601	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01156) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ESS-3205, Apr10) 10-Jun-10 (No. DAE4-601, Jun10)	Och-11 Och-15 Mar-15 Mar-11 Apr-11 Jun-11
vimary Standards ower meter EPM-442A ower sensor HP 8481A eference 20 dB Attenuator yoe-N mismalch combination laference Probe ES30V3 AE4 econdary Standards ower sensor HP 8481A	ID # GB37480704 US37292783 SN: 5086 (J0g) SN: 5047.2 / D6327 SN: 3205 SN: 601	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01156) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ESS-3205, Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house)	Och-11 Och-15 Mar-15 Mar-11 Apr-11 Jun-11 Scheduled Check
Nimary Standards Nover moter EPM-442A Tower sensor HP 8481A Inference 20 dB Attenuator type-N minimatic combination telerance Probe ES30V3 MAE4 Incondary Standards Nover sensor HP 8481A IF generator R&S SMT-06	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3055 SN: 601	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01160) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (In house)	Och 11 Och 15 Mar-15 Mar-11 Apr-11 Aun-11 Scheduled Check In house check: Och-11
Nimary Standards Nover moter EPM-442A Nover sensor HP 8481A Neference 20 58 Attenuator Type-N micrositic combination Neference Prube ES30V3 DAE4 Nover sensor HP 8481A NF generator R&S SMT-06	ID # 0837480704 U\$37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601 ID # MY41092317 100005 U\$37390585 \$4006	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01158) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. ES3-3205, Apr10) 18-Oct-01 (In house check Oct-09) 18-Oct-01 (In house check Oct-10)	Och-11 Och-15 Mar-15 Mar-15 Mar-11 Apn-11 Jun-11 Scheduled Check In house check: Och-15 In house check: Och-11 In house check: Och-11
ower meter EPM-442A peer sersion HP 8481A eference 20 dB Abenuator yoe-N mismatch combination aference Probe ES3OV3 AE4 econdary Standards ower sension HP 8481A F generator R&S SMT-06 etwork Analyzer HP 8753E	IQ # GB37480704 US37292783 SN: 5066 (20g) SN: 5067 2 / 06327 SN: 3005 SN: 601 IQ # MY41092317 100005 US37390585 \$4206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01158) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 16-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 16-Oct-01 (in house check Oct-09)	Och-11 Och-15 Mar-15 Mar-11 Apr-11 Apr-11 Aun-11 Scheduled Check In house check: Och-11 In house check: Och-11
Nimary Standards Nower meter EPM-442A Tower sersor HP 8481A Reference 20 dB Attenuator Type-N mineralish combination Reference Probe ES30V3 0AE4 Recondary Standards Nower sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	ID # 0837480704 U\$37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601 ID # MY41092317 100005 U\$37390585 \$4006	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01158) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. ES3-3205, Apr10) 18-Oct-01 (In house check Oct-09) 18-Oct-01 (In house check Oct-10)	Och-11 Och-15 Mar-15 Mar-15 Mar-11 Apn-11 Jun-11 Scheduled Check In house check: Och-15 In house check: Och-11 In house check: Och-11
Calibration Equipment used (M& Primary Standards Power sersor HP 442A Power sersor HP 4811A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator RSS SMT-os National HP 8753E Calibrated by:	IQ # GB37480704 US37292783 SN: 5066 (20g) SN: 5067 2 / 06327 SN: 3005 SN: 601 IQ # MY41092317 100005 US37390585 \$4206	06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01158) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE4-601, Jun10) Check Date (in house) 16-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-09) 18-Oct-01 (in house check Oct-10)	Och-11 Och-15 Mar-15 Mar-15 Mar-11 Apn-11 Jun-11 Scheduled Check In house check: Och-11 In house check: Och-11 In house check: Och-11

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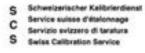
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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2		Page 100(139)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

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







Accreditation No.: SCS 108

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

Glossary:

TSL ConvF

N/A

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2		Page 101(139)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Measurement Conditions

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

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

Head TSL parameters

The following parameters and calculations were applied:

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

SAR result with Head TSL

SAR averaged over 1 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	nomalized to 1W	20.8 mW/g ± 16.5 % (k=2)

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	December 10-12, 2014	Rev 3		

Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

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

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

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

Phantom section: Flat Section

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

DASY5 Configuration:

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

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

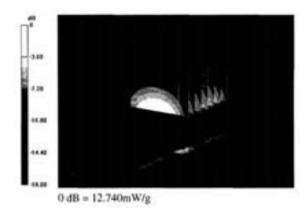
grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 18.648 W/kg

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

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

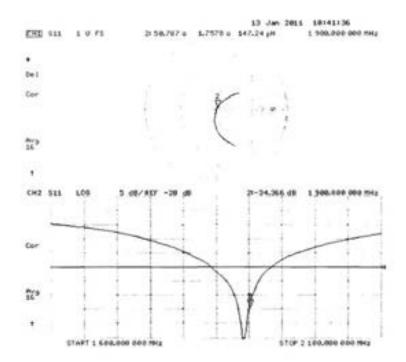


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	December 10-12, 2014	Rev 3		

Impedance Measurement Plot for Head TSL



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





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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1900V2-545 Jan13 CALIBRATION CERTIFICATE Object D1900V2 - SN: 545 QA CAL-05.v9 Calibration procedure(x) Calibration procedure for dipole validation kits above 700 MHz January 09, 2013 Calibration date: This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (St). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70% Calibration Equipment used (M&TE critical for calibration) Cal Date (Certificate No.) Scheduled Calibration Primary Standards Die GB32480704 01-Nov-12 (No. 217-01640) Oct-13 Power meter EPM-442A 01-Nov-12 (No. 217-01640) Oct-13 Power sensor HP 8481A US37292783 Reference 20 dfl Attenuator EN: 5058 (20k) 27-Mar-12 (No. 217-01530) Apr-13 Type N mismatch combination SN: 5047.3 / 06327 27-Mar-12 (No. 217-01533) Apr-13 Reference Probe ES3DV3 SN: 3006 26-Dec-12 (No. ES3-3205_Dec12) Dec-13 27-Jun-12 (No. DAE4-601_Jun12) Jun-13 DAE4 SN: 601 ID # Check Date (in house) Scheduled Check Secondary Standards MY41002317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 Power serieor HP 8481A RF generator R&S SMT-00 In house check: Oct-13 04-Aug-99 (in house check Oct-11) 100005 In house check: Oct-13 US37390585 S4206 18-Oct-01 (in house check Oct-12) Network Analyzer HP 87536. Function Calibrated by: lurae El-Niso Laboratory Technician Approved by: Technical Manager Issued: January 9, 2013 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: D1900V2-545, Jan 13

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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 106(139)
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

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





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Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Measurement Conditions

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

DASY Version	DASYS	V52.8.4
Extrapolation	Advanced Extrapolation	100,000
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

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

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

Certificate No: D1900V2-545, Jan 13

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2		Page 108(139)	
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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.0 \O + 1.7 \O	- 1
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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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2		Page 109(139)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

DASY5 Validation Report for Head TSL

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

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

Phantom section: Flat Section

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

DASY52 Configuration:

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

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

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

> - 12.00 - 12.00

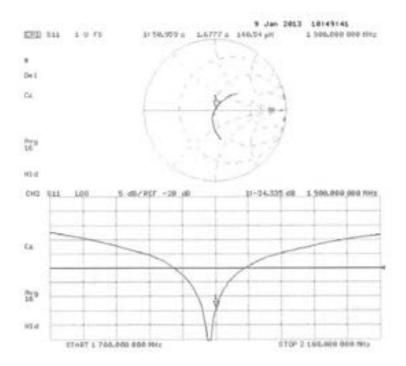
> > 0 dB = 12.2 W/kg = 10.86 dBW/kg

Certificate No. D1900V2-545_Jan13

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≅ BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 110(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Impedance Measurement Plot for Head TSL



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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2		Page 111(139)	
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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 112(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Calibration Laboratory of Schmid & Partner Engineering AG Zeogramsesses 43, 8004 Zurlon, Switterland





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

Accreditation No.: SCS 108

RTS (RIM Testing Services) Certificate No: D1900V2-5d075_Apr11 CALIBRATION CERTIFICATE D1900V2 - SN: 5d075 Object Calibration procedure(s) QA CAL-05.v8 Calibration procedure for dipole validation kits April 5, 2011 Carbration date This calibration conflicate documents the traceability to national standards, which stallage the physical units of measurements (\$1). The measurements and the uncertainties with confidence probability are given on the liviousne pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature G2 x 30°G and humidity x 70%. Calibration Equipment used (M&TE critical for calibration): 101 Printery Standards Call Date (Out Boxte No.) Scheduled Calibration Power meter EPM-442A GB37480264 06-Oct-10 (No. 217-01266) Od:11 Power sensor HF 5481A US37292763. 56-Oct-15 (No. 217-01266) Oct-11 Polarator 20:58 Alterustor SN: 5086 (20g) 29-Mar-11 (No. 217-01368) Apr-12 SN: 5047.2 / 06027 Type N mismatch combination 29-Mar-11 (No. 217-01371) Apr.12 SN: 3205 30 Apr 15 (No. 853-3205, Apr 15) Polyrency Probe ES30V3 Apr-11 DAE4 10-Jun-10 (No. DAE4-601_Junit); Junes SN: 601 Secondary Standards 10.0 Check Date (in house) Scheduled Check MY41992317 Power sensor HP 6481A 16-Oct 07 (in house chuck Oct-09) in house check: Oct-11 RF generator RNS SMT-od 100005 4-Aug-99 (in house check Oct-09) In house check, Oct-11 Network Analyzor HP 8753E U537390585 54206 In house check: Oct-11 18-Oct-01 (in house check Oct-10) **Function** Calibrated by: Threil Laboratory Technicien Reke Approved by: Issued April 8, 2011 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: D1900V2-5d075_Apr11

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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2		Page 113(139)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

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S Swiss Calibration Service

Accreditation No.: SCS 108

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Multilateral Agreement for the recognition of calibration certificates

Glossary:

N/A

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

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- EC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compilance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compilance 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: 01900V2-5d075_April 1	Page 2 of 6	

≅ BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 114(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Measurement Conditions

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

DASY Version	DASYS	V52,6.2
Extrapolation	Advanced Extrapolation	1100.00
Phantom	Modular Flat Phentom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters
The following parameters and calculations were applied.

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

SAR result with Head TSL

SAR normalized

SAR for nominal Head TSL parameters

SAR averaged over 1 cm ² (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.2 mW / g
SAR nomalized	normalized to 1W	40.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	40.4 mW/g x 17.0 % (k=2)
SAR averaged over 10 cm ² (10 g) of Head TSL	condition	
annumerades over 10 cm. (10 B) or used 15r	congison	
SAR measured	250 mW input power	5.29 NW / g

normalized to 1W

normalized to 1W

21.2 mW/g

21.0 mW/g ± 16.5 % (k=2)

Certificate No: D1900V2-5d075_April 1

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 115(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.5 Ω + 6.1 jΩ
impedance, transcribed to lead point	22.2 21 + 0.1 [81
Return Loss	- 23.3 dB

General Antenna Parameters and Design

and the second of the second o	
Electrical Delay (one direction)	1.197 cs
The second section of the second section of the second section	

After long form 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 amenna 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: D1900V2-56075_Apr11

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2		Page 116(139)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

DASY5 Validation Report for Head TSL

Date/Time: 05.04.2011 12:41:39

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL U12 BB

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

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 SN3205; ConvEt5.09, 5.09; 5.09; Calibrated, 30.04,2010
- Sensur-Surface: Jones (Mochanical Surface Detection)
- Electronics: DAE4 Sa601; Calibrated: 10:06.2010.
- Phannom: Flux Phannom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2029)

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

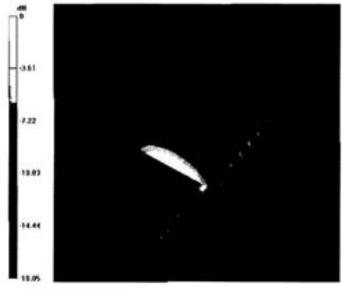
Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 18.796 W/kg

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

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



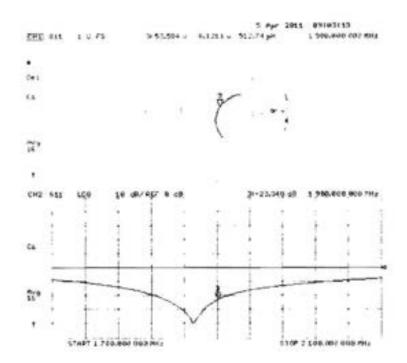
 $0 \text{ dB} \approx 12.480 \text{mW/g}$

Certificate No: D1900V2:5d075_Apr11

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Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
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Impedance Measurement Plot for Head TSL



≅ BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2		Page 118(139)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

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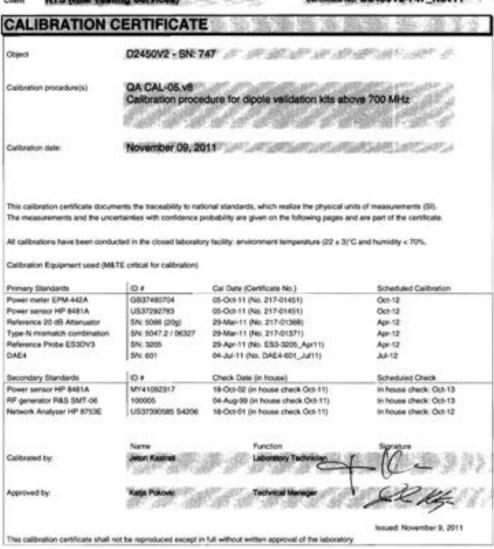
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Cont RTS (RIM Testing Services)

Certificate No: D2450V2-747_NoV11

Accreditation No.: SCS 108



Certificate No: D2450V2-747_Nov11

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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2		Page 119(139)	
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

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





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Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Mutilisteral Agreement for the recognition of calibration certificates

Glossary:

TSL tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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Certificate No: D2450V2-747, Nov11	Page 2 of 6	

≅ BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2		Page 120(139)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Measurement Conditions

DASY Version	DASYS	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 a 1 MHz	

Head TSL parameters
The following parameters and calculations were applied.

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

SAR result with Head TSL

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

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

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 121(139)
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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5 \Omega + 1.3 \mu
Return Loss	-31.2 dB

General Antenna Parameters and Design

Property Brown and Company of the Co	
Electrical Delay (one direction)	1.161 ns
and the second s	in the same of the

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 01, 2003

Certificate No: D2450V2-747_Nov11

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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 122(139)
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

DASY5 Validation Report for Head TSL

Date: 09.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 2450 MHz

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

Phantom section: Flat Section

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

DASY52 Configuration:

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

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 102.1 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 28.853 W/kg SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.39 mW/g Maximum value of SAR (measured) = 17.782 mW/g

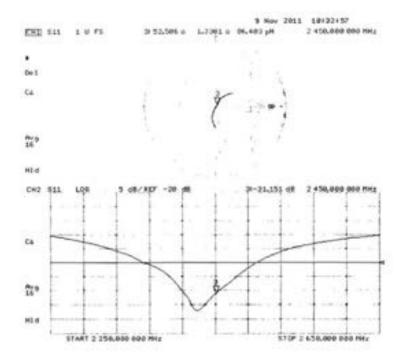


Certificate No: D2450V2-747_Nov11

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Impedance Measurement Plot for Head TSL



≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 124(139)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

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





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Multilateral Agreement for the recognition of calibration certificates

Clerk RTS (RIM Testing Services)

Certificate No: D5GHzV2-1033 Nov11

Accreditation No.: SCS 108

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Object	D5GHzV2 - SN:	1033	CONTRACTOR OF THE PARTY OF THE
Calibration procedure(s)	31000 AND THE PROPERTY OF THE PERSON.	dure for dipole validation kits bet	tween 3-6 GHz
Calibration date:	November 15, 20	Marketin and Street Street	dent de la company
		onal standards, which realize the physical un robability are given on the following pages at	
All calibrations have been condu	cted in the closed laborator	ry facility: environment temperature (22 s 3)*	C and humidity < 70%.
Calibration Equipment used (M&	TE critical for celibrations		
	TE critical for celibration)	Cal Date (Certificate No.)	Scheduled Calibration
Yimary Standards		Cal Date (Certificate No.) 05-Oct-11 (No. 217-01451)	Scheduled Calibration Oct-12
Primary Standards Power mater EPM-442A	10+		
Primary Standards Power mater EPM-442A Power sensor HP 8481A	ID # GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Primary Standards Power mater EPM-442A Power sensor HP 8481A Reference 20 d8 Attenuator	ID # GB37480704 US37290783	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451)	Oct-12 Oct-12
Primary Standards Power mater EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination	ID # G837460704 US37292783 SN: 5066 (20g)	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368)	Oct-12 Oct-12 Apr-12
Primary Standards Power mater EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EXSOV4	ID # G837480704 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-12 Apr-12
Primery Standards Power meter EPM-642A Power sensor HP 8481A Reference 20 dB Attenuation Type-N mismatch combination Reference Probe EXSOV4 DAE4	ID # G837480704 US37292783 SN: 5086 (25g) SN: 5047.2 / 06327 SN: 3503	05-Oct-11 (No. 217-01451) 06-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EX3-3503_Mar11)	Ost-12 Ost-12 Apr-12 Apr-12 Mar-12
Calbration Equipment used (M& Primary Standards Power mater EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EXSOV4 DAE4 Secondary Standards Power sensor HP 8481A	ID # G837480704 US37292783 SN: 5082 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 601	05-Oct-11 (No. 217-01451) 06-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EX3-3503_Mar-11) 04-Jul-11 (No. EX3-3503_Mar-11)	Oct-12 Oct-12 Apr-12 Apr-12 Mar-12 Jul-12
Primary Standards Power mater EPM-442A Power sensor HP 8481A Reference 20 d8 Attenuator Type N mismatch combination Reference Probe EXSOV4 DAE4 Secondary Standards Power sensor HP 8481A	ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 801	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_Mar11) 04-Jul-11 (No. DAE4-601_Jul11) Check Date (in house)	Oct-12 Oct-12 Apr-12 Apr-12 Mer-12 Jul-13 Scheduled Check
Primary Standards Power matter EPM-442A Power sensor HP 8481A Reference 20 dB Ameruator Type-N mismatch combination Reference Probe EXSDV4 DAE4 Secundary Standards	ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 801 ID # MY41092317	05-Oct-11 (No. 217-01451) 06-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01366) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EX3-3503_Mar11) 04-Jul-11 (No. DAE4-601_Jul11) Check Date (in house) 18-Oct-02 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Mar-12 Jul-13 Scheduled Check In house check: Oct-13
Primary Standards Power mater EPM-442A Power sensor HP 9481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EXSOV4 DAE4 Secondary Standards Power sensor HP 9481A RF generator R&S SMT-06	ID # G837480704 US37297783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3503 SN: 601 ID # MY41082317 100005 US37390585 S4206	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EAS-4503_Mar-11) 04-Mar-11 (No. EAS-4601_Aut11) 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)	Och 12 Och 12 Apri 12 Apri 12 Apri 12 Mari 12 Jul 12 Scheduled Check In house check: Och 13 In house check: Och 13 In house check: Och 12
Primary Standards Power meter EPM-642A Power sensor HP 8481A Reference 20 dB Attenuation Type-N insensatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	ID # G837460704 US37297763 SN: 5066 (20g) SN: 5047.2 / 06327 SN: 3503 SN: 601 ID # MY41092317 100005 US37390585 \$4206	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01388) 29-Mar-11 (No. 217-01388) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EX3-3503, Mar11) 04-Mar-11 (No. EX3-3503, Mar11	Oct-12 Oct-12 Apr-12 Apr-12 Mar-12 Jul-12 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-642A Power sensor HP 8481A Reference 20 dB Attenuation Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	ID # G837480704 US37297783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3503 SN: 601 ID # MY41082317 100005 US37390585 S4206	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EAS-4503_Mar-11) 04-Mar-11 (No. EAS-4601_Aut11) 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)	Och 12 Och 12 Apri 12 Apri 12 Apri 12 Mari 12 Jul-12 Scheduled Check In house check: Och 13 In house check: Och 13 In house check: Och 12
Primary Standards Power mater EPM-442A Power sensor HP 9481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EXSOV4 DAE4 Secondary Standards Power sensor HP 9481A RF generator R&S SMT-06	ID # G837480704 US37292783 SN: 9086 (20g) SN: 9047.2 / 06327 SN: 3503 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name Dence Serv	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01388) 29-Mar-11 (No. 217-01388) 29-Mar-11 (No. 217-01371) 04-Mar-11 (No. EX3-3503, Mar11) 04-Mar-11 (No. EX3-3503, Mar11	Och 12 Och 12 Apri 12 Apri 12 Apri 12 Mari 12 Jul-12 Scheduled Check In house check: Och 13 In house check: Och 13 In house check: Och 12

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	December 10-12, 2014	Rev 3		

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





S Schweizerischer Kalibrierdienst
C Service sulese d'étalonnage
Servizio svitzero di tarafura
S Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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≅ BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 126(139)
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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
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Measurement Conditions

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

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

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

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

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm ² (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 m/W /g ± 17.0 % (k×2)

SAR averaged over 10 cm ⁸ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.33 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	23.0 mW/g ± 16.5 % (k=2)

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

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

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm3 (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 cm² (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.50 m/W / g
SAR for nominal Head TSL parameters	normalized to 1W	24.7 mW / g ± 16.5 % (kx2)

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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 mho/m a 6 %
Head TSL temperature change during test	< 0.5 °C		****

SAR result with Head TSL at 5800 MHz

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

SAR averaged over 10 cm3 (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)

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Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	51.1 \(\Omega - 8.7 \)\(\Omega\)
Return Loss	- 21.2 dB

Antenna Parameters with Head TSL at 5500 MHz

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

Antenna Parameters with Head TSL at 5800 MHz

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1.202 ns
Committee and a committee of the committ	

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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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

DASY5 Validation Report for Head TSL

Date: 15.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Phantom section: Flat Section

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

DASY52 Configuration:

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

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

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 65.595 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 30.134 W/kg $SAR(1 g) \approx 8.16 \text{ mW/g}; SAR(10 g) = 2.33 \text{ mW/g}$ 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

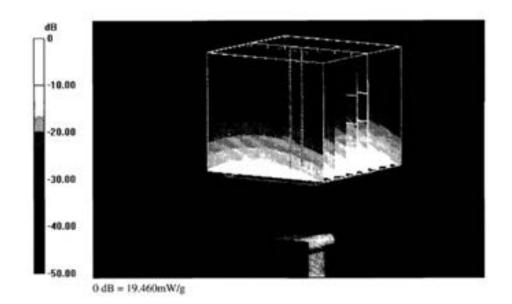
Peak SAR (extrapolated) = 33,743 W/kg

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

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

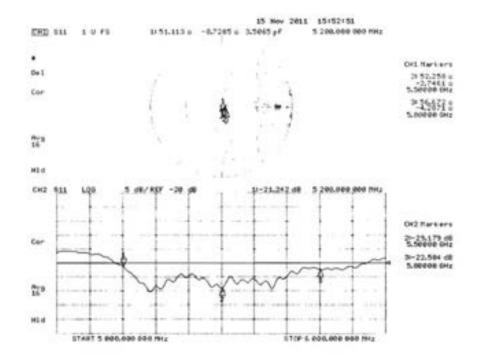
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Impedance Measurement Plot for Head TSL



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	December 10-12, 2014	Rev 3		

Calibration Laboratory of Schmid & Partner Engineering AG Zeoghausstresse 43, 8004 Zeolon, Sekteerland





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Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

The Series Accreditation Service is one of the signatories to the EA. Multilateral Agreement for the recognition of califoration certificates.

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		

Measurement Conditions

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

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

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSI, parameters	22.0 °C	36.0	4.66 mho/m
Measured Hood TSL parameters	(22.0 ± 0.2) °C	35.0 ± 6 %	4.46 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	-	time .

SAR result with Head TSL at 5200 MHz

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

SAR averaged over 10 cm ² (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.6 W/kg = 19.5 % (kx2)

Head TSL parameters at 5500 MHz

the following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22:0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 + 8%	4.75 mhom ± 6 %
Hoad TSL temperature change during test	< 0.5 °C	-	

SAR result with Head TSL at 5500 MHz

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

SAR averaged over 10 cm² (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.9 W/kg a 19.5 % (kx2)

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≅ BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 135(139)
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Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

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

SAR result with Head TSL at 5800 MHz

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

SAR averaged over 10 cm² (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.6 W/kg ± 19.5 % (kx2)

Certificate No: DSGHzV2-1000_Nov13

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFL111LW SAR Report Rev 2			Page 136(139)
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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	49.1 \(\Omega \cdot 9.6 \)	
Return Loss	- 20.0 dB	

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	50.3 (1 - 4.1 (1	
Return Loss.	- 27.7 aB	

Antenna Parameters with Head TSL at 5800 MHz

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1,213 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG		
Manufactured on	July 00, 2004		

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Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

DASY5 Validation Report for Head TSL

Dute: 08.11.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

 MH_{ℓ}

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

Medium parameters used: f = 5800 MHz; $\sigma = 5.06 \text{ S/m}$; $\varepsilon_r = 34.2$; $\rho = 1000 \text{ kg/m}^3$

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); Calibrated: 28.12.2012, ConvF(4.91, 4.91, 4.91); Calibrated: 28.12.2012, ConvF(4.81, 4.81); Calibrated: 28.12.2012;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013.
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

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

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

Peak SAR (extrapolated) = 29.5 W/kg

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

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

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

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

Reference Value = 64,397 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 33.8 W/kg

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

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

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

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

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

Penk SAR (extrapolated) = 33.0 W/kg

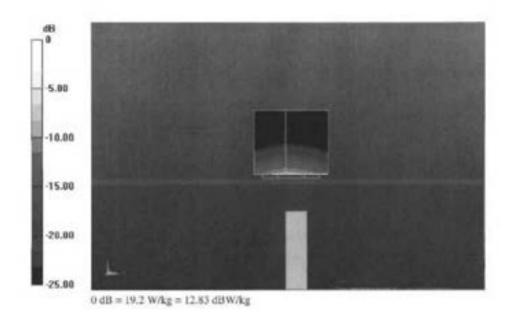
SAR(1 g) = 8.01 W/kg; SAR(10 g) = 2.28 W/kg

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

Curtificate No: 05GHzV2-1033_Nov13

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Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013	RTS-6026-1302-13	L6ARFL110LW	2503A-RFL110LW
	December 10-12, 2014	Rev 3		



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Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22 2012 – Feb 28 2013 December 10-12, 2014	RTS-6026-1302-13 Rev 3	L6ARFL110LW	2503A-RFL110LW

Impedance Measurement Plot for Head TSL

