

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA



Author Data
Andrew Becker

Dates of Test Jan 11 – July 04, 2011
 Test Report No
 FCC ID:

 RTS-3640-1102-04B
 L6AF

 L6AF

FCC ID: IC ID L6ARDM70UW 2503A-RDM70UW L6AREN70UW 2503A-REN70UW

Calibration Laborato Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurk		Hac MRA	S Schweizerischer Kalibrierd Service suisse d'étalonnag Servizio svizzero di taratura S Swiss Calibration Service	0
Accredited by the Swiss Accredit The Swiss Accreditation Servic Multilateral Agreement for the	e is one of the signatori	es to the EA	editation No.: SCS 108	
Client RTS (RIM Tes	ting Services)	े। Certi	ficate No: ET3-1643_Mar10	; I
CALIBRATION	CERTIFICAT	E		
Object	ET3DV6 - SN:1	543		
Calibration procedure(s)		QA CAL-23.v3 and QA CAL edure for dosimetric E-field		
Calibration date:	March 9, 2010	u ^{gli}		
All calibrations have been conde Calibration Equipment used (M&		ory facility: environment temperature (22 ± 3)°C and humidity < 70%.	
Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration	
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10	
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10	
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10	
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10	
Reference 20 dB Attenuator Reference 30 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10 Mar-10	
Reference Probe ES3DV2	SN: S5129 (30b) SN: 3013	31-Mar-09 (No. 217-01027) 30-Dec-09 (No. ES3-3013 Dec09		
DAE4	SN: 660	29-Sep-09 (No. DAE4-660_Sep06		
Secondary Standards	ID#	Check Date (in house)	Scheduled Check	
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)		
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09	i) In house check: Oct10	
	Name	Function	Signature	
Calibrated by:	Jeton Kasirati	Laboratory Technicia	· < / - //~	4 mil
Approved by:	Katja Pokovic	Technical Manager	Jol: My	
This calibration certificate shall	not be reproduced except	n full without written approval of the la	Issued: March 10, 2010 boratory.	
Certificate No: ET3-1643 Ma		Page 1 of 11		



Author Data	
Andrew	Becker

Dates of Test Jan 11 – July 04, 2011

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18RP

FCC ID: IC ID **L6ARDM70UW** 2503 **L6AREN70UW** 2503

UW 2503A-RDM70UW 2503A-REN70UW

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

Document



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

Accreditation No.: SCS 108

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

Glossary:

olocouly.	
TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization ϕ	φ rotation around probe axis
Polarization 9	9 rotation around an axis that is in the plane normal to probe axis (at measurement center),
	i.e., 8 = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

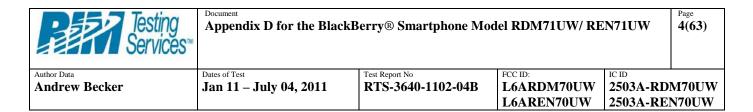
- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held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

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 9 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not 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 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.
- Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z; A, B, C are numerical linearization parameters assessed based on the data of
 power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the
 maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx, y, z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom
 exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Certificate No: ET3-1643_Mar10

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March 9, 2010

Probe ET3DV6

SN:1643

Manufactured: Last calibrated: Recalibrated: November 7, 2001 March 10, 2009 March 9, 2010

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

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Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

March 9, 2010

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DASY - Parameters of Probe: ET3DV6 SN:1643

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) ²) ^A	1.75	2.01	1.79	± 10.1%
DCP (mV) ⁸	93.2	91.0	90.9	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	С	VR mV	Unc ^E (k=2)
10000	cw	0.00	×	0.00	0.00	1.00	300.0	± 1.5%
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

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

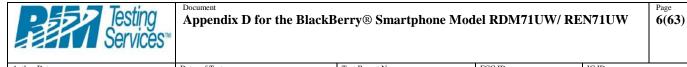
* The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and θ).

⁸ Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

Certificate No: ET3-1643_Mar10

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Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

March 9, 2010

DASY - Parameters of Probe: ET3DV6 SN:1643

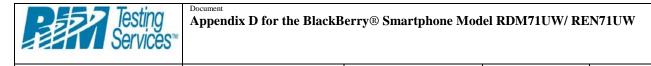
Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz)	Validity [MHz] ^C	Permittivity	Conductivity	ConvFX Co	onvFY Co	nvF Z	Alpha	Depth Unc (k=2)
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	6.01	6.01	6.01	0.42	2.35 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.99	4.99	4.99	0.62	2.35 ± 11.0%
1950	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.74	4.74	4.74	0.79	2.10 ± 11.0%

^C The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

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Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
	•		L6AREN70UW	2503A-REN70UW

March 9, 2010

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DASY - Parameters of Probe: ET3DV6 SN:1643

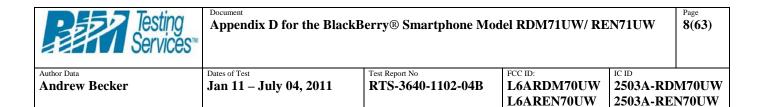
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz] ^C	Permittivity	Conductivity	ConvF X Cor	nvFY Co	nvF Z	Alpha	Depth Unc (k=2)
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	5.93	5.93	5.93	0.33	2.77 ± 11.0%
1810	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.58	4.58	4.58	0.75	2.63 ± 11.0%
1950	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.54	4.54	4.54	0.99	2.20 ± 11.0%

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

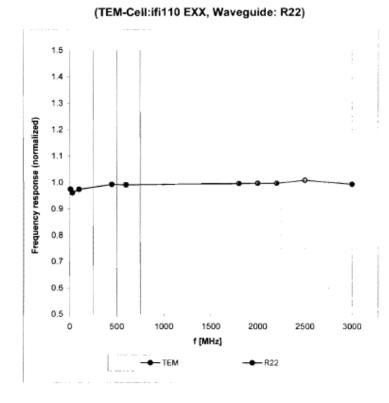
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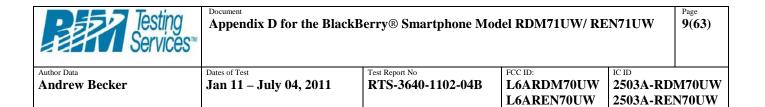
Frequency Response of E-Field



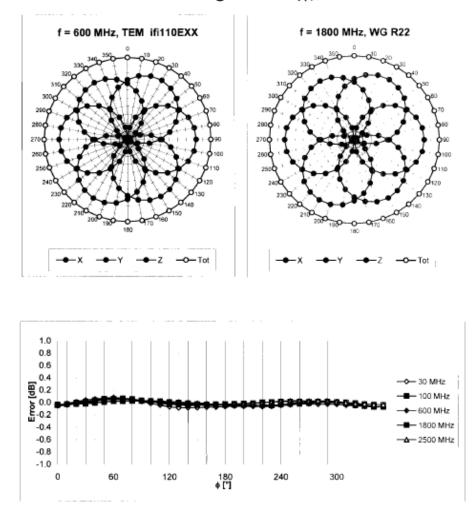
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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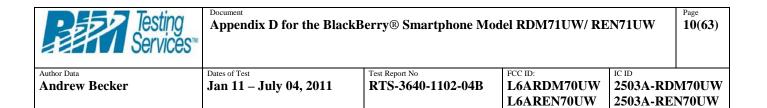


Receiving Pattern (ϕ), $\vartheta = 0^{\circ}$

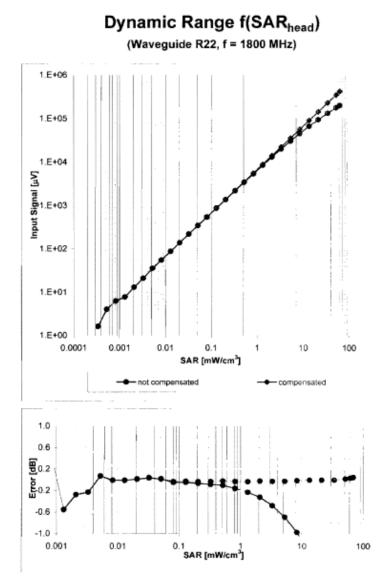
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

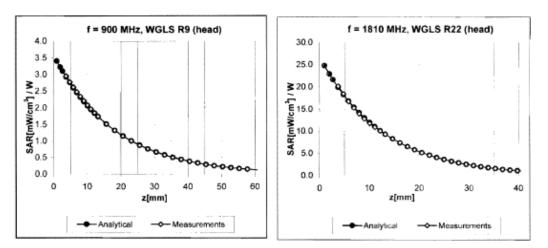
Certificate No: ET3-1643_Mar10

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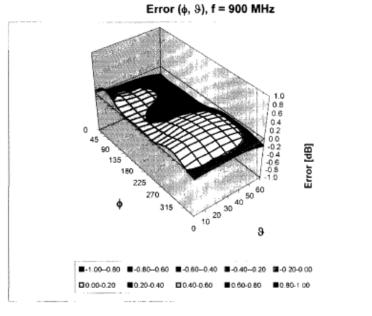


March 9, 2010



Conversion Factor Assessment

Deviation from Isotropy in HSL



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

March 9, 2010

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Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	enabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

Certificate No: ET3-1643_Mar10

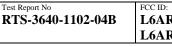
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Author Data	
Andrew	Becker

Jan 11 – July 04, 2011

Dates of Test



FCC ID: IC ID L6ARDM70UW 2503A-RDM70UW L6AREN70UW 2503A-REN70UW

Schmic Engir	ation Laboratory of J & Partner neering AG Istrasse 43, 6004 Zurich, Switzerland		(g 👽 z)	 Schwalzenscher Kellbrierdienst Service suisse d'étalonnage Servicio svizzero di teratura Swies Calibration Service
	d by the Swiss Accreditation Service (SAS) » Accreditation Service is one of the signator	ries to the F&	Accreditati	ion No.: SCS 108
	al Agreement for the recognition of calibratio			
Client	RTS (RM Testing Services)		Certificate	No: ET3-1644_Nov10

Collection procedure(s) Collection date		QA CAL-23.v3 and QA CAL-25.v2 edure for dosimetric E-field probe 010	
Calibration class	November 16, 2	010	
The médisuréments and the unce Al celibrations have been conduc	viainties with confidence , cled in the closed laboral	bonal standards, which replice the physical un probability are given on the following pages an ory facility: environment temperature $(22\pm3)^2$	d are part of the certificate
Calibration Equipment used (M&)	i E cirbéai for cafibration)		
Primary Standards		Cal Date (Certificate No.)	Scheduled Calibration
ower meter E44198	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
ower sensor E4412A	MY4 1495277	1-Apr-10 (No. 217-01438)	Apr-11
ower sensor E4412A	MY41498087	1-Apr-10 (No. 217-01≢36)	Apr-11
eference 3 dB Attenuator	SN: \$5054 (3ç)	30-Mar-10 (No. 217-01159)	Mar-1 (
eference 20 dB Attenuator	SN: \$5065 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
cforence 30 dB Alteruator	SN: 35129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
aference Prote ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013 _Dec09)	Dec-10
AE4	SN: 660	20-Apr-10 (No. DAE4-560_Apr10)	Adr-11
econdary Standards	1D #	Check Date (in house)	Scheduled Check
IF generator HP 864BC	US3642U01700	4-Aug-59 (in house check Oct-09)	In house check: Oct-11
etwork Analyzer HP 3753E	U\$37390585	18-Ocl-01 (in house check Ocl-10)	It house check: Dct-11
	Name	Function	Signature
Calibrated by	Jelon Kasireli	Laboratory Technician	fell
Approved by.	Kalja Pokovic	Technical Manager	leig
Tuis collision conditions			Issued: November 17, 2010
This calibration certificate shall no	n be reproduced axcept t	n ful without written approval of the laboratory	



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Author Data Andrew Becker

Jan 11 – July 04, 2011

Document

Dates of Test

Test Report No RTS-3640-1102-04B FCC ID: L6ARDM70UW L6AREN70UW

IC ID 2503A-RDM70UW 2503A-REN70UW

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



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- Service sulses d'étalonnage Ç 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

Glossann

arossary.	
TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvE	sensitivity in TSL / NORMK, y,z
DCP	diade compression point
CF	creat factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization ϕ	φ rotation around probe axis
Polarization 9	9 rotation around an axis that is in the plane normal to probe axis (at measurement center),
	r.e., 9 = 0 is normal to probe axis

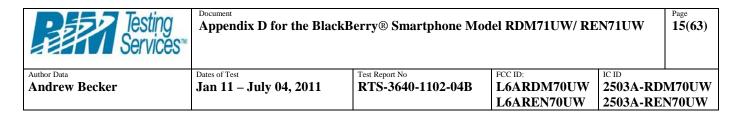
Calibration is Performed According to the Following Standards:

- 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
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005.

Methods Applied and Interpretation of Parameters:

- NORMX,y,z: Assessed for E-field polarization 9 = 0 (f < 900 MHz in TEM-cell: f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not 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 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.
- 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 In 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 antennal
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required,

Certificate No: ET3-1644 Nov10



November 16, 2010

Probe ET3DV6

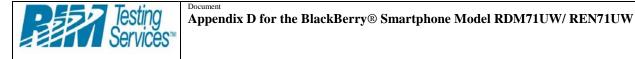
SN:1644

Manufactured: Last calibrated: Recalibrated: November 7, 2001 November 11, 2009 November 16, 2010

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

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) ²) ⁴	1.83	1.95	2.01	± 10,1%
DCP (mV) ⁸	97.9	97.9	96.6	

Modulation Calibration Parameters

סוט	Communication System Name	PAR		A dB	B dBuV	С	VR mV	Unc [±] (k=2)
10000	CVY	0.00	x	ú.00	0.00	1.00	143.5	±3.4 %
			Y	0.00	0.00	1.00	146.8	
			z	0.00	0.00	1.00	148.4	I I

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%.

 $^{\circ}$ The uncertainties of NormX Y Z do not affect the E^{2} hold uncertainty inside TSL (see Pages 6 and 6)

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 $^{^{\}rm 5}$ Numerical -meanization parameter uncertainty not required.

¹ Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the equare of the field value.



Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

November 16, 2010

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

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz] ⁵	Permittivity	Conductivity	ConvFX Co	nvFY Co	nvF Z	Alpha	Depth Unc (k= 2)
76D	\pm 50 / \pm 100	41.9 ± 5%	0.89 ± 5%	6.54	6.54	6.54	0.31	3.05 ± 11.0%
900	$\pm 507 \pm 100$	41.5 ± 5%	0.97±5%	6.00	6.00	6.00	0.27	3.46 ± 11.0%
1810	$\pm 50 / \pm 100$	40.0 ± 5%	1 4 0 ± 5%	5.09	5.09	5.09	0.40	$2.50 \pm 11.0\%$
2450	±50/±100	38.2 ± 5%	1.80 ± 5%	4.42	4.42	4.42	0.99	$1.27 \pm 11.0\%$

¹ The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvE uncertainty at calibration frequency, and the uncertainty for the indicated frequency band.

Certificate No. ET3-1644_Nov10

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Document Appendix D for the BlackBerry® Smartphone Model RDM71UW/ REN71UW 18(63)

Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

ET3DV6 SN:1644

November 16, 2010

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

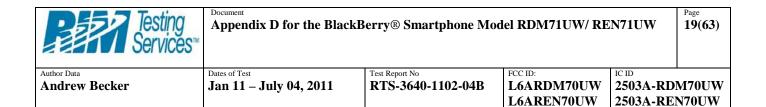
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz)	Validity (MHz) ^c	Permittivity	Conductivity	ConvF X Cor	∎vFY Co	nvF Z	Alpha	Depth Unc (k=2)
750	± 50 (± 100	55 5 ± 5%	$0.96 \pm 5\%$	6.14	6.14	6.14	0.31	3.06 ± 11.0%
900	\pm 50 (\pm 100	55 0 ± 5%	$1.05\pm5\%$	5.93	5.93	5 93	0.36	2.71 ± 11.0%
1810	\pm 50 / \pm 100	53 3 ± 5%	1.52 ± 5%	4.59	4.59	4 59	0 32	2.60 ± 11.0%
2450	± 50/± 100	52.7 ± 5%	$1.95\pm5\%$	4.05	4.05	4 05	0.99	1.23 ± 11.0%

¹² The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration (requency and the uncertainty for the indicated frequency band

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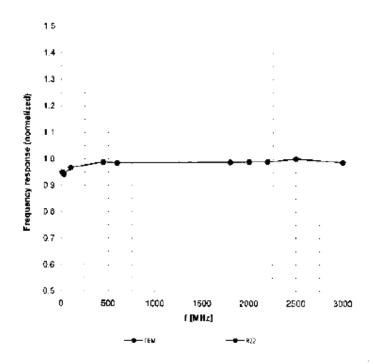
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Frequency Response of E-Field

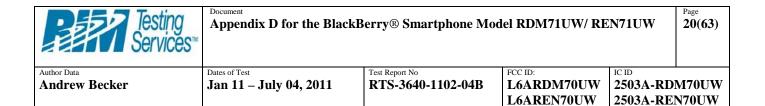
(TEM-Cell:ifi110 EXX, Waveguide: R22)



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

Certificate No: ET3-1644_Nov10

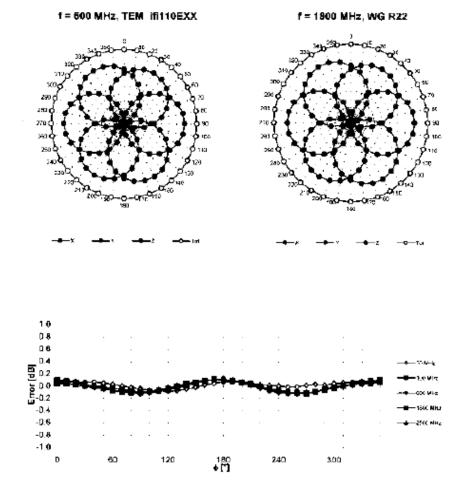
Page 7 of 11



ET3DV6 \$N:1644

November 16, 2010

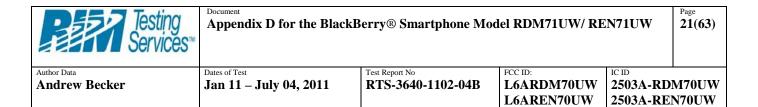
Receiving Pattern (¢), 9 = 0°



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

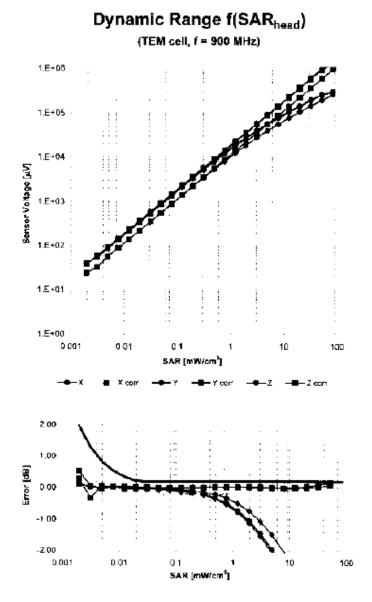
Certificate No: ET3-1644 Nov10

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ET3DV6 \$N:1644

November 16, 2010

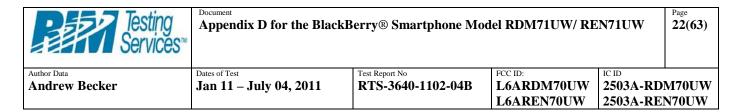


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

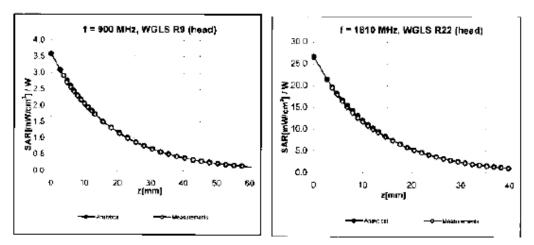
Certificate No: ET3-1644_Nov10

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November 16, 2010



Conversion Factor Assessment

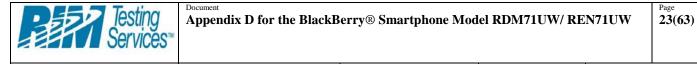


Error (é, 9), f = 900 MHz

Uncertainty of Spherical Isotropy Assessment: ± 2.5% (k=2)

Certificate No. ET3-1644, Nov10

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Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 20	11 RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

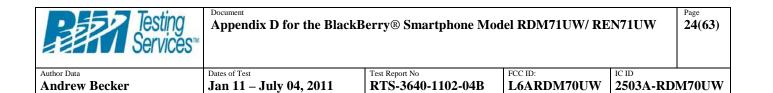
November 16, 2010

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	enabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	3.7 mm

Certificate No. ET3-1644_Nov10

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L6AREN70UW

2503A-REN70UW

Accredited by the Swiss Accreditation Service (SAS) Accreditation No.: SCS 108 The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates Client RTS (RIM Testing Services) Certificate No: D835V2-446 CALIBRATION CERTIFICATE D835V2 - SN: 446 Object D835V2 - SN: 446 Calibration procedure(s) QA CAL-05.v7 Calibration procedure for dipole validation kits	Jan09
Client RTS (RIM Testing Services) Certificate No: D835V2-446 CALIBRATION CERTIFICATE Object D835V2 - SN: 446 Calibration procedure(s) QA CAL-05.v7	Jan09
CALIBRATION CERTIFICATE Object D835V2 - SN: 446 Calibration procedure(s) QA CAL-05.v7	Jan09
Object D835V2 - SN: 446 Calibration procedure(s) QA CAL-05.v7	
Calibration procedure(s) QA CAL-05.v7	
Calibration procedure(s) QA CAL-05.v7	
Calibration procedure for dipole validation kits	Contraction of
Calibration date: January 05, 2009	and the second second
Campianon Date. January 00, 2008	
Condition of the calibrated item In Tolerance	ALC: NO
Calibration Equipment used (M&TE critical for calibration)	
Primary Standards ID # Cal Date (Certificate No.) Scheduled Cali	bration
Power meter EPM-442A GB37480704 08-Oct-08 (No. 217-00898) Oct-09 Power sensor HP 8481A US37292783 08-Oct-08 (No. 217-00898) Oct-09	
Reference 20 dB Attenuator SN: 5086 (20g) 01-Jul-08 (No. 217-00864) Jul-09	
Type-N mismatch combination SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09	
Type-N mismatch combination SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09	
Type-N mismatch combination SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 Reference Probe ES3DV2 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Apr-09	ck
Type-N mismatch combination SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 Reference Probe ES3DV2 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Apr-09 DAE4 SN: 601 14-Mar-08 (No. DAE4-601_Mar08) Mar-09 Secondary Standards ID # Check Date (in house) Scheduled Che	
Type-N mismatch combination SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 Reference Probe ES3DV2 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Apr-09 DAE4 SN: 601 14-Mar-08 (No. DAE4-601_Mar08) Mar-09 Secondary Standards ID # Check Date (in house) Scheduled Che	Oct-09
Type-N mismatch combination SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 Reference Probe ES3DV2 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Apr-08 DAE4 SN: 601 14-Mar-08 (No. DAE4-601_Mar08) Mar-09 Secondary Standards ID # Check Date (in house) Scheduled Che Power sensor HP 6481A MY41092317 18-Oct-02 (in house check Oct-07) In house check RF generator R&S SMT-06 10005 4-Aug-99 (in house check Oct-07) In house check	Oct-09 Oct-09
Type-N mismatch combination SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 Reference Probe ES3DV2 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Apr-08 DAE4 SN: 601 14-Mar-08 (No. DAE4-601_Mar08) Mar-09 Secondary Standards ID # Check Date (in house) Scheduled Che Power sensor HP 6481A MY41092317 18-Oct-02 (in house check Oct-07) In house check RF generator R&S SMT-06 10005 4-Aug-99 (in house check Oct-07) In house check	Oct-09 Oct-09
Type-N mismatch combination SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 Reference Probe ES3DV2 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Apr-09 DAE4 SN: 601 14-Mar-08 (No. DAE4-601_Mar08) Mar-09 Secondary Standards ID # Check Date (in house) Scheduled Che Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-07) In house check RF generator R&S SMT-06 100005 4-Aug-99 (in house check Oct-07) In house check Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-08) In house check	Oct-09 Oct-09
Type-N mismatch combination Reference Probe ES3DV2 SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 DAE4 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Apr-08 DAE4 SN: 601 14-Mar-08 (No. DAE4-601_Mar08) Mar-09 Secondary Standards ID # Check Date (in house) Scheduled Che Power sensor HP 6481A MY41092317 18-Oct-02 (in house check Oct-07) In house check RF generator R&S SMT-06 10005 4-Aug-99 (in house check Oct-07) In house check Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-08) In house check Calibrated by: Jeton Kastrati Laboratory Technician Signature	Oct-09 Oct-09
Type-N mismatch combination Reference Probe ES3DV2 SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 DAE4 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Apr-09 DAE4 SN: 601 14-Mar-08 (No. DAE4-601_Mar08) Mar-09 Secondary Standards ID # Check Date (in house) Scheduled Che Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-07) In house check RF generator R&S SMT-06 100005 4-Aug-99 (in house check Oct-07) In house check Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-08) In house check Name Function Signature Signature Signature	Oct-09 Oct-09
Type-N mismatch combination Reference Probe ES3DV2 SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 DAE4 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Apr-08 DAE4 SN: 601 14-Mar-08 (No. DAE4-601_Mar08) Mar-09 Secondary Standards ID # Check Date (in house) Scheduled Che Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-07) In house check RF generator R&S SMT-06 100005 4-Aug-99 (in house check Oct-07) In house check Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-08) In house check Calibrated by: Jation Kastrati Laboratory Technician Signature	Oct-09 Oct-09



Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
		RTS-3640-1102-04B		2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

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



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

Accreditation No.: SCS 108

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

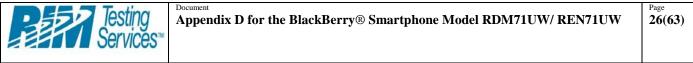
d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Certificate No: D835V2-446 Jan09

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Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

Measurement Conditions

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

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 %	0.91 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C		

SAR result with Head TSL

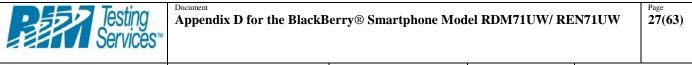
SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.40 mW / g
SAR normalized	normalized to 1W	9.60 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	9.50 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 mW/g
SAR normalized	normalized to 1W	6.32 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	6.27 mW /g ± 16.5 % (k=2)

1 Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D835V2-446_Jan09

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Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8 Ω - 6.9 jΩ	
Return Loss	- 23.3 dB	

General Antenna Parameters and Design

ſ	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.

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_Jan09

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Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

DASY5 Validation Report for Head TSL

Date/Time: 05.01.2009 10:38:06

Page

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Test Laboratory: SPEAG, Zurich, Switzerland

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

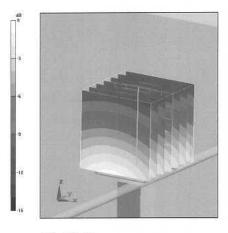
Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1 Medium: HSL 900 MHz Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.1; ρ = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 SN3025; ConvF(5.97, 5.97, 5.97); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Pin=250mW; dip=15mm; dist=3.4mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.7 V/m; Power Drift = 0.024 dBPeak SAR (extrapolated) = 3.54 W/kgSAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.58 mW/gMaximum value of SAR (measured) = 2.7 mW/g



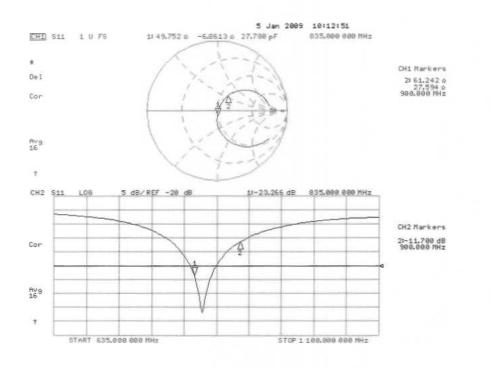
0 dB = 2.7 mW/g

Certificate No: D835V2-446 Jan09

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Testing Services™	Appendix D for the BlackBerry® Smartphone Model RDM71UW/ REN71UW		N71UW	Page 29(63)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC ID	
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RD	M70UW
			L6AREN70UW	2503A-RE	N70UW

Impedance Measurement Plot for Head TSL

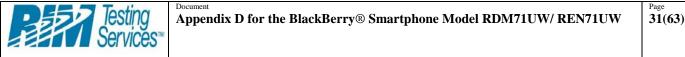


Certificate No: D835V2-446_Jan09

Page 6 of 6

r Data drew Becker	Dates of Test Jan 11 – Jul	ly 04, 2011	Test Report No RTS-3640-1102-04B	FCC ID: L6ARDM70UW L6AREN70UW	IC ID 2503A-RDM701 2503A-REN70U
\$	Calibration Laborator Schmid & Partner Engineering AG eeghausstrasse 43, 8004 Zuric		Hac-MEA CR ORAL	S Schweizerischer Ka C Service suisse d'éta Servizio svizzero di S Swiss Calibration S	lonnage taratura
1	Accredited by the Swiss Accred The Swiss Accreditation Service Autilateral Agreement for the n	s is one of the signatorie	es to the EA	ditation No.: SCS 108	
	Client RTS (RIM Testi			cate No: D1900V2-545~	lan09
6	CALIBRATION C	ERTIFICATI			
	Object	D1900V2 - SN: 5	545		
1	Calibration procedure(s)	QA CAL-05.v7 Calibration proce	edure for dipole validation ki	15	
	Calibration date:	January 06, 200	9		
	Condition of the calibrated item	In Tolerance	and the second		
			ional standards, which realize the phys robability are given on the following p		
			ry faoility: environment temperature (2	2 ± 3)*C and humidity < 70%.	
1	Calibration Equipment used (M&T	E critical for calibration)			
	Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V2	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3025	Cal Date (Calibrated by, Certificate 08-Oct-08 (No. 217-00898) 08-Oct-08 (No. 217-00898) 01-Jul-08 (No. 217-00864) 01-Jul-08 (No. 217-00867) 28-Apr-08 (No. ES3-3025_Apr08)	No.) Scheduled Calib Oct-09 Oct-09 Jul-09 Jul-09 Jul-09 Apr-09	ration
	DAE4	SN: 601	14-Mar-08 (No. DAE4-601_Mar08)	Mar-09	
1	Secondary Standards Power sensor HP 6481A RF generator R&S SMT-06 Network Analyzer HP 8753E	ID # MY41082317 100005 US37390585 S4206	Check Date (in house) 18-Oct-02 (in house check Oct-07) 4-Aug-99 (in house check Oct-07) 18-Oct-01 (in house check Oct-08)	In house check:	Oct-09 Oct-09
		Name	Function	Signature	
	Calibrated by:	Jelon Kastrati	Laboratory Technician	12/4	1
4		All and the second second	Contraction of the second second	a straight of the second	

Certificate No: D1900V2-545_Jan09



Author Data	Dates of Test	Test Report No	FCC ID:	IC ID	
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RD	M70UW
			L6AREN70UW	2503A-RE	N70UW

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



Schweizerischer Kalibrierdienst Service suisse d'étalonnage

C Service suisse d'étalonnage Servicio svizzero di taratura

S Swiss Calibration Service

Accreditation No.: SCS 108

S

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

Glossary:

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

Calibration is Performed According to the Following Standards:

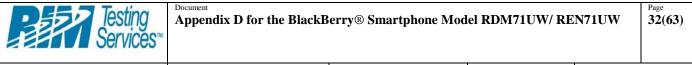
- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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



Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

Measurement Conditions

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

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	39.2 ± 6 %	1.47 mho/m ± 6 %
Head TSL temperature during test	(21.0 ± 0.2) °C		

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	10.2 mW/g
SAR normalized	normalized to 1W	40.8 mW/g
SAR for nominal Head TSL parameters 1	normalized to 1W	39.5 mW/g±17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.29 mW / g
SAR normalized	normalized to 1W	21.2 mW/g
SAR for nominal Head TSL parameters ¹	normalized to 1W	20.8 mW / g ± 16.5 % (k=2)

Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D1900V2-545_Jan09



Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.9 Ω + 1.9 jΩ	
Return Loss	- 34.4 dB	

General Antenna Parameters and Design

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

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

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

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

Additional EUT Data

Manufactured by	SPEAG		
Manufactured on	November 15, 2001		



DASY5 Validation Report for Head TSL

Document

Date/Time: 06.01.2009 13:17:58

Page

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Test Laboratory: SPEAG, Zurich, Switzerland

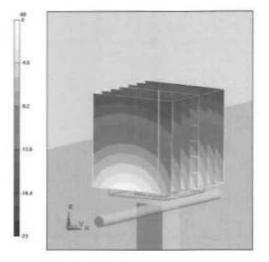
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:545

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium: HSL U10 BB Medium parameters used: f = 1900 MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 SN3025; ConvF(4.9, 4.9, 4.9); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

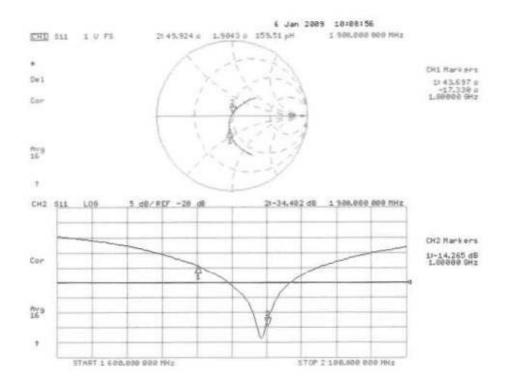
Pin = 250 mW; dip = 10 mm, scan at 3.4mm/Zoom Scan (dist=3.4mm, probe 0deg) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 92.5 V/m; Power Drift = 0.037 dB Peak SAR (extrapolated) = 19 W/kg SAR(1 g) - 10.2 mW/g; SAR(10 g) - 5.29 mW/g Maximum value of SAR (measured) = 12 mW/g



0 dB = 12 mW/g

Testing Services™	Document Appendix D for the BlackBerry® Smartphone Model RDM71UW/ REN71UW				Page 35(63)
Author Data	Dates of Test	Test Report No	FCC ID:	IC ID	
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RD	M70UW
			L6AREN70UW	2503A-RE	N70UW

Impedance Measurement Plot for Head TSL



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Testing Services™	Appendix D for the BlackBerry® Smartphone Model RDM71UW/ REN71UW			
uthor Data Andrew Becker	Dates of Test Jan 11 – July 04, 2011	Test Report No RTS-3640-1102-04B		A-RDM70UW A-REN70UW
Calibration Labor Schmid & Partner Engineering AG Zeughausstrasse 43, 8004	-	BC MRA C SHISS S C C Z Z RUBRATO S	Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service	
	creditation Service (SAS) Service is one of the signatories r the recognition of calibration	s to the EA	No.: SCS 108	
Client RTS (RIM	Testing Services)	Certificate No	: D2450V2-747_Nov09	
CALIBRATIO	NCERTIFICATE	la <u>ka kata na kata s</u> a		5. A
Object	D2450V2 - SN 7	47,	1 3 4 6 6 5 5	
Calibration procedure(s)	QA CAL-05.v7 Calibration proce	dure for dipole validation kits		
Calibration date:	November 11, 20	69	1 1 1 4	
The measurements and th All calibrations have been	e uncertainties with confidence p	onal standards, which realize the physical un robability are given on the following pages an ry facility: environment temperature $(22 \pm 3)^{\circ}$	d are part of the certificate.	
	lan a			
Primary Standards Power meter EPM-442A	ID # GB37480704	Cal Date (Certificate No.) 06-Oct-09 (No. 217-01086)	Scheduled Calibration Oct-10	
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086) 06-Oct-09 (No. 217-01086)	Oct-10 Oct-10	
Reference 20 dB Attenuate		31-Mar-09 (No. 217-01025)	Mar-10	
Type-N mismatch combina		31-Mar-09 (No. 217-01029)	Mar-10	
Reference Probe ES3DV3	SN: 3205	26-Jun-09 (No. ES3-3205_Jun09)	Jun-10	
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10	
Secondary Standards	iD#	Check Date (in house)	Scheduled Check	
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11	
RF generator R&S SMT-0	6 100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11	
Network Analyzer HP 8753	3E US37390685 S4206	18-Oct-01 (in house check Oct-09)	in house check: Oct-10	
Calibrated by:	Name Mike Meile	Function Laboratory Technician	Signature	12
Approved by:	Katja Pokovio	Technical Manager	al B	
This calibration certificate	shall not be reproduced except in	full without written approval of the laboratory	Issued: November 16, 2009	
Certificate No: D2450V2	-747_Nov09	Page 1 of 6		

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			L6AREN70UW	2503A-RE	N70UW



Author Data **Andrew Becker**

Jan 11 – July 04, 2011

Document

Dates of Test

Test Report No RTS-3640-1102-04B

L6ARDM70UW L6AREN70UW

IC ID 2503A-RDM70UW 2503A-REN70UW

Calibration Laboratory of

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





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

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. ٠ No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

Certificate No: D2450V2-747 Nov09

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FCC ID:

Accreditation No.: SCS 108

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			L6AREN70UW	2503A-RE	N70UW



Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

Measurement Conditions

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

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	the second set one have reached to obtain a second se
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.1 ± 6 %	1.78 mho/m ± 6 %
Head TSL temperature during test	(21.3 ± 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	13.3 mW / g
SAR normalized	normalized to 1W	53.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	53.4 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.23 mW / g
SAR normalized	normalized to 1W	24.9 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.9 mW /g ± 16.5 % (k=2)

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Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RD	
			L6AREN70UW	2503A-RE	N70UW



Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.9 Ω + 0.9 jΩ
Return Loss	- 33.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.161 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG		
Manufactured on	December 01, 2003		

Testing Services™	Document Appendix D for the BlackB	Document Appendix D for the BlackBerry® Smartphone Model RDM71UW/ REN71UW				
Author Data	Dates of Test	Test Report No	FCC ID:	IC ID		
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RD		
			L6AREN70UW	2503A-RE	N70UW	



DASY5 Validation Report for Head TSL

Document

Date/Time: 11.11.2009 15:04:10

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Test Laboratory: SPEAG, Zurich, Switzerland

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

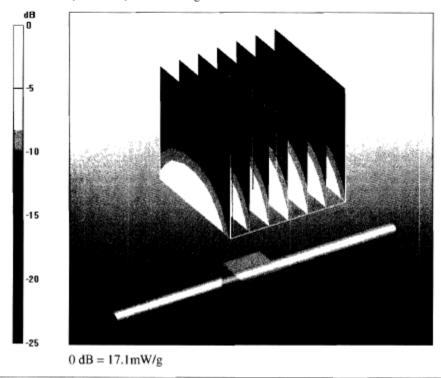
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium: HSL U11 BB Medium parameters used: f = 2450 MHz; σ = 1.79 mho/m; ϵ_r = 39.2; ρ = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- · Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 101.3 V/m; Power Drift = 0.067 dB Peak SAR (extrapolated) = 27 W/kg SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.23 mW/g Maximum value of SAR (measured) = 17.1 mW/g

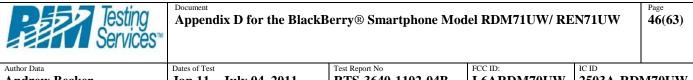


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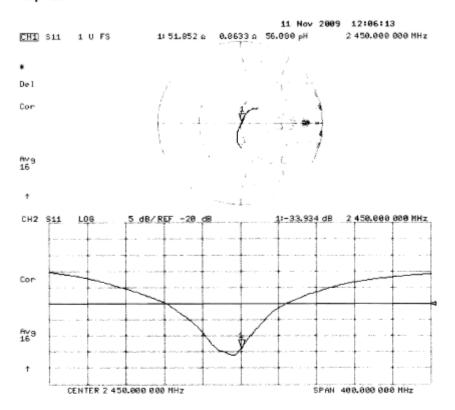
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Testing Services™	Document Appendix D for the BlackB	Document Appendix D for the BlackBerry® Smartphone Model RDM71UW/ REN71UW				
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			L6AREN70UW	2503A-RE	N70UW	



Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

Impedance Measurement Plot for Head TSL



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		nackberry® Smartphone Mo	del RDM71UW/ RE	N71UW 47(
Becker	Dates of Test Jan 11 – July 04, 2011	Test Report No RTS-3640-1102-04B	FCC ID: L6ARDM70UW L6AREN70UW	IC ID 2503A-RDM70 2503A-REN70
Calibration Lab Schmid & Partne Engineering A Zeughausstrasse 43, 8	er	REAL REAL SHISS S	Schweizerischer Kalibrierdi Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service	2
The Swiss Accreditation	Accreditation Service (SAS) on Service is one of the signatorie t for the recognition of calibration	es to the EA	No.: SCS 108	
	M Testing Services)		: ES3-3225_Jan11	
CALIBRAT	ION CERTIFICAT	E		
Object	E\$3DV3 - SN:32	225 · · · · · · · · · · · · · · · · ·	e fill and a star	
Calibration procedure(s		QA CAL-23.v4 and QA CAL-25.v3 adure for dosimetric E-field probes		
Calibration date:	January 13, 201	n an		
This calibration certifica	ate documents the traceability to nat	ional standards, which realize the physical uni	is of measurements (SI).	
The measurements and All calibrations have be	d the uncertainties with confidence p	ional standards, which realize the physical uni probability are given on the following pages an any facility: environment temperature (22 ± 3)*C	d are part of the certificate.	
The measurements and All calibrations have be Calibration Equipment	d the uncertainties with confidence p een conducted in the closed laborato used (M&TE critical for calibration)	probability are given on the following pages an iny facility: environment temperature $(22 \pm 3)^{\circ}C$	d are part of the certificate.	
The measurements and All calibrations have be	d the uncertainties with confidence p een conducted in the closed laborate	probability are given on the following pages and	d are part of the certificate.	
The measurements and All calibrations have be Calibration Equipment Primary Standards	d the uncertainties with confidence p een conducted in the closed laborato used (M&TE critical for calibration)	orobability are given on the following pages an ny facility: environment temperature (22 ± 3)*C Cal Date (Certificate No.)	d are part of the certificate. 2 and humidity < 70%. Scheduled Calibration	
The measurements and All calibrations have be Calibration Equipment Primary Standards Power meter E44198 Power sensor E4412A Power sensor E4412A	d the uncertainties with confidence p een conducted in the closed laborate used (M&TE critical for calibration) ID # GB41293874 MY41495277 MY41498087	Cal Date (Certificate No.) 1-Apr-10 (No. 217-01136) 1-Apr-10 (No. 217-01136) 1-Apr-10 (No. 217-01136) 1-Apr-10 (No. 217-01136) 1-Apr-10 (No. 217-01138)	d are part of the certificate. c and humidity < 70%. Scheduled Calibration Apr-11 Apr-11 Apr-11	
The measurements and All calibrations have be Calibration Equipment Primary Standards Power meter E44198 Power sensor E4412A Power sensor E4412A Reference 3 dB Attenui	d the uncertainties with confidence p een conducted in the closed laborate used (M&TE critical for calibration) ID # GB41293874 MY41495277 MY41498087 ator SN: S5054 (3c)	Cal Date (Certificate No.) 1-Apr-10 (No. 217-01136) 1-Apr-10 (No. 217-01136) 1-Apr-10 (No. 217-01136) 1-Apr-10 (No. 217-01136) 30-Mar-10 (No. 217-01159)	d are part of the certificate. c and humidity < 70%. Scheduled Calibration Apr-11 Apr-11 Apr-11 Mar-11	
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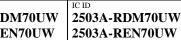


Author Data Andrew Becker

Jan 11 – July 04, 2011



FCC ID: L6ARDM70UW L6AREN70UW



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



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- С Servizio svizzero di taratura
- s Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

Document

Dates of Test

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Glossary'

Qioooui yi	
TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization o	φ rotation around probe axis
Polarization 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:

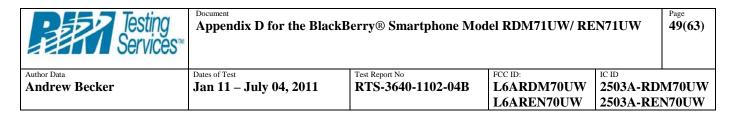
- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques*, December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held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

Methods Applied and Interpretation of Parameters:

- NORMx, y, z: Assessed for E-field polarization 9 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz; R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not 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 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.
- Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx, y, z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

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January 13, 2011

Probe ES3DV3

SN:3225

Manufactured: Last calibrated: Recalibrated: September 1, 2009 December 11, 2009 January 13, 2011

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
	•		L6AREN70UW	2503A-REN70UW

January 13, 2011

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) ²) ^A	1.26	1.21	1.31	± 10.1%
DCP (mV) ⁸	102.1	100.8	99.1	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	с	VR mV	Unc ^E (k=2)
10000	CW	0.00	х	0.00	0.00	1.00	149.8	± 2.6 %
			Y	0.00	0.00	1.00	148.1	
			z	0.00	0.00	1.00	110.7	

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 TSL (see Pages 5 and 6).

⁶ Numerical linearization parameter: uncertainty not required.

⁶ Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

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Document Appendix D for the BlackBerry® Smartphone Model RDM71UW/ REN71UW 51(63)

Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

ES3DV3 SN:3225

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Page

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

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz] ^C	Permittivity	Conductivity	ConvF X Co	nvFY Cor	wFZ	Alpha	Depth Unc (k=2)
750	± 50 / ± 100	41.9 ± 5%	0.89 ± 5%	6.47	6.47	6.47	0.89	1.08 ± 11.0%
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	6.11	6.11	6.11	0.81	1.10 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	5.26	5.26	5.26	0.37	1.68 ± 11.0%
1950	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.98	4.98	4.98	0.48	1.51 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.60	4.60	4.60	0.52	1.54 ± 11.0%
2600	± 50 / ± 100	39.0 ± 5%	1.96 ± 5%	4.52	4.52	4.52	0.53	1.58 ± 11.0%

^C The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Certificate No: ES3-3225_Jan11

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Document Appendix D for the BlackBerry® Smartphone Model RDM71UW/ REN71UW 52(63)

Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

ES3DV3 SN:3225

January 13, 2011

Page

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

Calibration Parameter Determined in Body Tissue Simulating Media

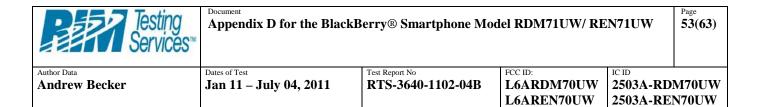
f [MHz]	Validity [MHz] ^C	Permittivity	Conductivity	ConvFX Co	nvFY Co	tvF Z	Alpha	Depth Unc (k=2)
750	± 50 / ± 100	55.5 ± 5%	0.96 ± 5%	6.30	6.30	6.30	0.76	1.17 ± 11.0%
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	6.12	6.12	6.12	0.72	1.20 ± 11.0%
1810	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.88	4.88	4.88	0.26	2.70 ± 11.0%
1950	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.89	4.89	4.89	0.33	2.28 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.43	4.43	4.43	0.99	1.04 ± 11.0%
2600	± 50 / ± 100	52.5 ± 5%	2.16 ± 5%	4.29	4.29	4.29	0.99	1.05 ± 11.0%

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency

and the uncertainty for the indicated frequency band.

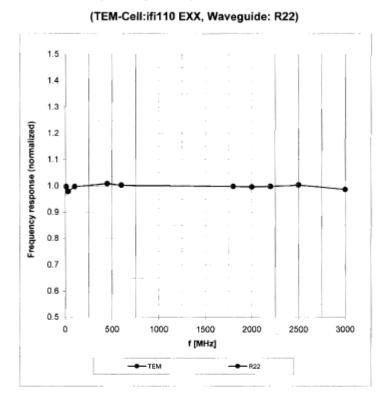
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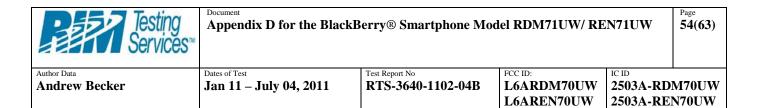
Frequency Response of E-Field



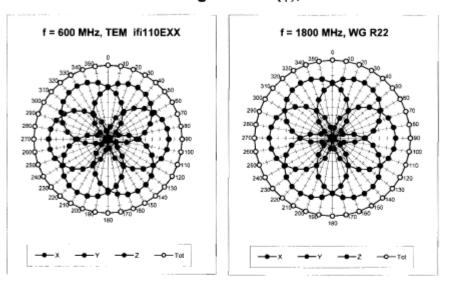
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Certificate No: ES3-3225_Jan11

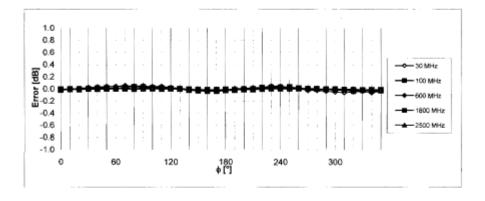
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January 13, 2011



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



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

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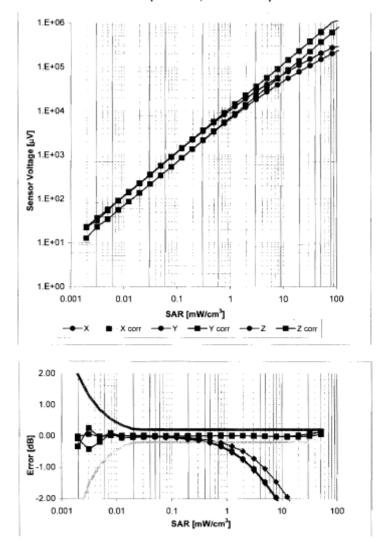


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2503A-REN70UW

L6AREN70UW

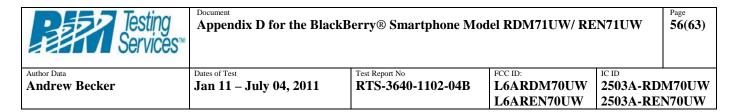
Dynamic Range f(SAR_{head}) (TEM cell, f = 900 MHz)



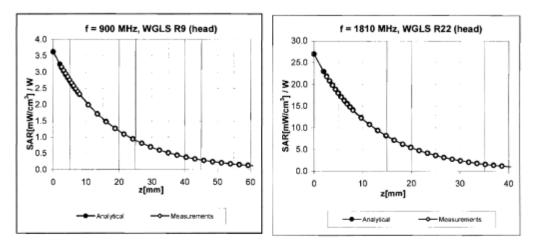
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: ES3-3225_Jan11

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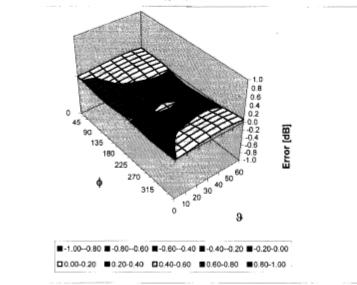
January 13, 2011



Conversion Factor Assessment

Deviation from Isotropy in HSL

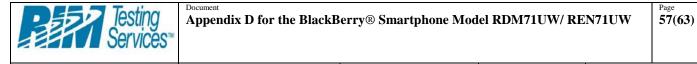
Error (¢, 3), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: ES3-3225_Jan11

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Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

January 13, 2011

Other Probe Parameters

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

Certificate No: ES3-3225_Jan11

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Dealers	Dates of Test	Test Report No	FCC ID:	
Becker	Jan 11 – July 04, 201	1 RTS-3640-1102-04B	L6ARDM70UW L6AREN70UW	2503A-RDM 2503A-REN
Calibration Labora	tory of	Silver Silver	Schweizerischer Kalibriere	dienst
Schmid & Partner			Service suisse d'étalonnag	-
Engineering AG Zeughausstrasse 43, 8004 2	Zurich, Switzerland	RIGRATO S	Servizio svizzero di taratu Swiss Calibration Service	
Accredited by the Swiss Acc	, ,		No.: SCS 108	
	ervice is one of the signatorie the recognition of calibration			
	esting Services)		: D1800V2-2d020_Ja	in11
CALIBRATION	I CERTIFICATE			
Object	D1800V2 - SN: 2	d020	alle de la company de la company.	
Calibration procedure(s)	QA CAL-05.v8		19-92 C	
Calibration procedure(s)		dure for dipole validation kits		
	a sana ana ang palanaki fikikiki			
Calibration date:	January 13, 2011			
This calibration certificate do	curnents the traceability to nati	onal standards, which realize the physical uni		
	,	onal standards, which realize the physical uni robability are given on the following pages an	ts of measurements (SI).	
The measurements and the	uncertainties with confidence p		ts of measurements (SI). d are part of the certificate.	
The measurements and the All calibrations have been ca	uncertainties with confidence p	robability are given on the following pages an	ts of measurements (SI). d are part of the certificate.	
The measurements and the All calibrations have been ca	uncertainties with confidence p onducted in the closed laborator	robability are given on the following pages an	ts of measurements (SI). d are part of the certificate.	
The measurements and the All calibrations have been ca Calibration Equipment used Primary Standards Power meter EPM-442A	uncertainties with confidence p onducted in the closed laborator (M&TE critical for calibration) ID # GB37480704	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266)	ts of measurements (SI). d are part of the certificate. C and humidity < 70%. Scheduled Calibration Oct-11	
The measurements and the All calibrations have been ca Calibration Equipment used Primary Standards Power meter EPM-442A Power sensor HP 8481A	Incertainties with confidence p onducted in the closed laborator (M&TE critical for calibration) ID # GB37480704 US37292783	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266)	ts of measurements (SI). d are part of the certificate. C and humidity < 70%. Scheduled Calibration Oct-11 Oct-11	
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The measurements and the All calibrations have been ca Calibration Equipment used Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combinati Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	uncertainties with confidence p onducted in the closed laborator (M&TE critical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) on SN: 5086 (20g) SN: 5086	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01266) 30-Mar-10 (No. 217-01158) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. 203-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function	ts of measurements (SI). d are part of the certificate. C and humidity < 70%. <u>Scheduled Calibration</u> Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 <u>Scheduled Check</u> In house check: Oct-11 In house check: Oct-11	1
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Author Data Andrew Becker

Jan 11 – July 04, 2011

Test Report No RTS-3640-1102-04B

L6ARDM70UW L6AREN70UW

FCC ID:

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Calibration Laboratory of

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



Schweizerischer Kalibrierdienst Service suisse d'étalonnage С Servizio svizzero di taratura

Swiss Calibration Service

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Document

Dates of Test

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed • point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. ٠ 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: D1800V2-2d020_Jan11

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Accreditation No.: SCS 108



60(63)

Author Data	Dates of Test	Test Report No	FCC ID:	IC ID
Andrew Becker	Jan 11 – July 04, 2011	RTS-3640-1102-04B	L6ARDM70UW	2503A-RDM70UW
			L6AREN70UW	2503A-REN70UW

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	1800 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

SAR averaged over 1 cm ³ (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)

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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

Certificate No: D1800V2-2d020_Jan11



Author Data	
Andrew	Becker

2503A-RDM70UW 2503A-REN70UW

DASY5 Validation Report for Head TSL

Document

Date/Time: 13.01.2011 12:34:12

Test Laboratory: SPEAG, Zurich, Switzerland

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

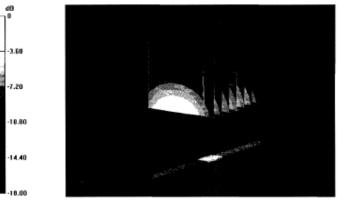
Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1 Medium: HSL U12 BB Medium parameters used: f = 1800 MHz; $\sigma = 1.38 \text{ mho/m}$; $\varepsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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 ٠
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001 ٠
- Measurement SW: DASY52, V52.6.1 Build (408) ٠
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595) ٠

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

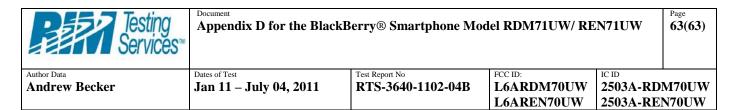
grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 96.654 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 17.902 W/kg SAR(1 g) = 9.78 mW/g; SAR(10 g) = 5.13 mW/gMaximum value of SAR (measured) = 12.051 mW/g



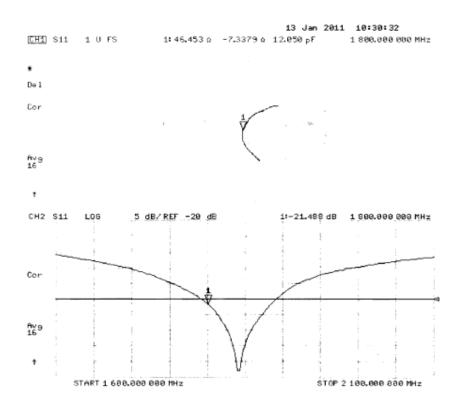
 $0 \, dB = 12.050 \, mW/g$

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Impedance Measurement Plot for Head TSL



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