Testing Services™	Appendix D for the BlackBerry® Smartphone Model RCV72UW SAR Report			
Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	March 15 – March 16, 2010	RTS-2474-1003-24	L6ARCV70	UW

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA



Appendix D for the BlackBerry $\$ Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No

s

RTS-2474-1003-24

FCC ID:

L6ARCV70UW

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





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lient RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: ES3-3225_Dec09

And the second s	ting Services)	terrific 2 Statement	Gerifficate No: ES3-3225_Dec09		
ALIBRATION	CERTIFICAT				
Object	ES3DV3 - SN:3	225	HARRIE BOOK I DE LE		
Calibration procedure(s)	Calibration proc	The designation of the property of the state	Marine and Company of the Company of		
Calibration date:	December 11, 2	009	nersign ellektronikon - toksone		
The measurements and the unco	ertainties with confidence	tional standards, which realize the physical uni probability are given on the following pages an ory facility: environment temperature (22 ± 3)°C	d are part of the certificate.		
Calibration Equipment used (M&	TE critical for calibration)				
Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration		
ower meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10		
ower sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10		
ower 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	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10		
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10		
Notice of the Park	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)			
	SN: 660	29-Sep-09 (No. DAE4-660_Sep09)	Jan-10 Sep-10		
AE4	SN: 660	29-Sep-09 (No. DAE4-660_Sep09) Check Date (in house)			
NAE4 Secondary Standards	1		Sep-10		
DAE4 Secondary Standards RF generator HP 8648C	ID #	Check Date (in house)	Sep-10 Scheduled Check		
Reference Probe ES30V2 DAE4 Secondary Standards RF generator HP 8648C Network Analyzer HP 8753E	ID # US3642U01700 US37390585	Check Date (in house) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-09) Function	Sep-10 Scheduled Check In house check: Oct-11		
DAE4 Secondary Standards RF generator HP 8648C	ID # US3642U01700 US37390585	Check Date (in house) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-09)	Sep-10 Scheduled Check In house check: Oct-11		
DAE4 Secondary Standards RF generator HP 8648C Network Analyzer HP 8753E	ID # US3642U01700 US37390585	Check Date (in house) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-09) Function	Sep-10 Scheduled Check In house check: Oct-11		

Certificate No: ES3-3225_Dec09

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No

RTS-2474-1003-24

FCC ID:

L6ARCV70UW

Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL tissue simulating liquid
NORMx,y,z sensitivity in free space
ConvF sensitivity in TSL / NORMx,y,z
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., 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
- 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 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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Testing Services™	Appendix D for the BlackBerry® SAR Report	Smartphone Model R	CV72UW	Page 4(41)
Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	March 15 – March 16, 2010	RTS-2474-1003-24	L6ARCV70	UW

Probe ES3DV3

SN:3225

Manufactured: September 1, 2009 Calibrated: December 11, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: ES3-3225_Dec09 Page 3 of 11



$\label{lem:second-equation} \textbf{Appendix D for the BlackBerry} \& \textbf{Smartphone Model RCV72UW SAR Report}$

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No **RTS-2474-1003-24**

FCC ID:

L6ARCV70UW

ES3DV3 SN:3225 December 11, 2009

DASY - 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	1.22	1.32	± 10.1%
DCP (mV) ^{II}	92.3	94.8	92.7	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	С	VR mV	Unc ^t (k=2)
10000	cw	0.00	х	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%.

Certificate No: ES3-3225_Dec09

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

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.

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Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	March 15 – March 16, 2010	RTS-2474-1003-24	L6ARCV70	UW

DASY - Parameters of Probe: ES3DV3 SN:3225

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz] ^C	Permittivity	Conductivity	ConvFX Co	nvFY Cor	ıvF Z	Alpha	Depth Unc (k=2)
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	6.12	6.12	6.12	0.99	1.07 ± 11.0%
1810	± 50 / ± 100	$40.0 \pm 5\%$	1.40 ± 5%	5.14	5.14	5.14	0.46	1.60 ± 11.0%
1950	± 50 / ± 100	$40.0 \pm 5\%$	$1.40 \pm 5\%$	4.96	4.96	4.96	0.47	1.57 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	$1.80 \pm 5\%$	4.53	4.53	4.53	0.41	1.89 ± 11.0%

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:	
Andrew Becker	March 15 – March 16, 2010	RTS-2474-1003-24	L6ARCV70	UW

DASY - Parameters of Probe: ES3DV3 SN:3225

Calibration Parameter Determined in Body Tissue Simulating Media

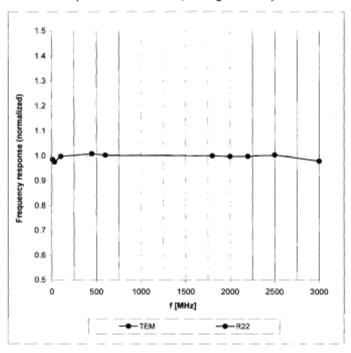
f [MHz]	Validity [MHz] ^C	Permittivity	Conductivity	ConvFX Co	nvFY Conv	F Z	Alpha	Depth Unc (k=2)
900	± 50 / ± 100	55.0 ± 5%	$1.05 \pm 5\%$	5.97	5.97	5.97	0.98	1.12 ± 11.0%
1810	±50/±100	$53.3 \pm 5\%$	1.52 ± 5%	4.90	4.90	4.90	0.35	2.07 ± 11.0%
1950	±50/±100	53.3 ± 5%	1.52 ± 5%	4.83	4.83	4.83	0.32	2.45 ± 11.0%
2450	±50/±100	52.7 ± 5%	1.95 ± 5%	4.32	4.32	4.32	0.74	1.27 ± 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

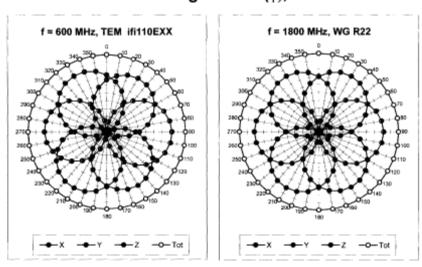
(TEM-Cell:ifi110 EXX, Waveguide: R22)

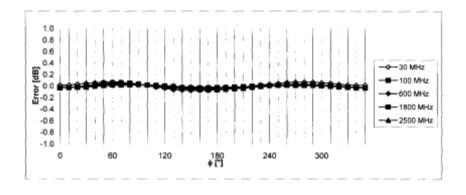


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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





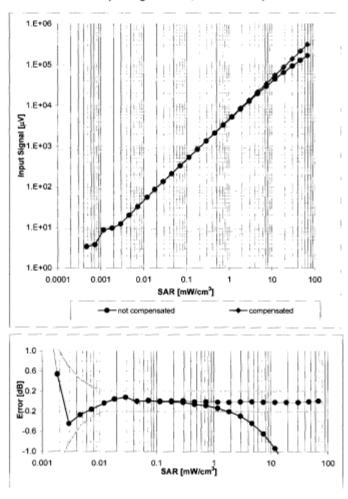
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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Dynamic Range f(SAR_{head})

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(Waveguide R22, f = 1800 MHz)

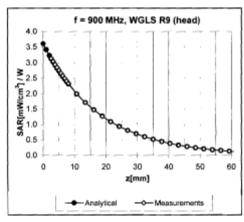


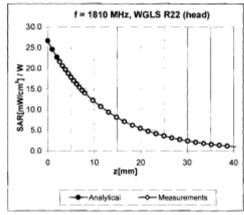
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	March 15 – March 16, 2010	RTS-2474-1003-24	L6ARCV70	UW

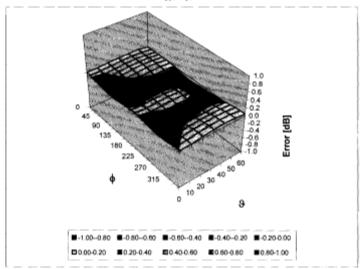
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (¢, 9), f = 900 MHz



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



Appendix D for the BlackBerry $\$ Smartphone Model RCV72UW SAR Report

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March 15 – March 16, 2010

Test Report No **RTS-2474-1003-24**

FCC ID:

L6ARCV70UW

ES3DV3 SN:3225

December 11, 2009

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	4.0 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



Appendix D for the BlackBerry® Smartphone Model RCV72UW SAR Report

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Andrew Becker

Dates of Test

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Test Report No

RTS-2474-1003-24

FCC ID:

L6ARCV70UW

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





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Accredited by the Swiss Accreditation Service (SAS)

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Client RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: ET3-1644_Nov09

Calibration procedure(s) QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2 Calibration procedure for dosimetric E-field probes Calibration date: November 11, 2009 This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Pawer 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	SN: S5066 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	29-Sep-09 (No. DAE4-660_Sep09)	Sep-10
Secondary Standards	ID#	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10
	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	-foller
Approved by:	Katja Pokovic	Technical Manager	De 119

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



Appendix D for the BlackBerry® Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No

RTS-2474-1003-24

FCC ID:

L6ARCV70UW

Calibration Laboratory of Schmid & Partner

Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





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Accreditation No.: SCS 108

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

Glossary:

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

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

Polarization 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., 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 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.

Testing Services™	Appendix D for the BlackBerry® Smartphone Model RCV72UW SAR Report			
Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	March 15 – March 16, 2010 RTS-2474-1003-24 L6ARCV70			UW

Probe ET3DV6

SN:1644

Manufactured: November 7, 2001 Last calibrated: November 10, 2008 Recalibrated: November 11, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)



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Author Data
Andrew Becker

Dates of Test

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Test Report No RTS-2474-1003-24 FCC ID:

L6ARCV70UW

ET3DV6 SN:1644

November 11, 2009

DASY - Parameters of Probe: ET3DV6 SN:1644

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) ²) ^A	1.85	1.95	1.93	± 10.1%
DCP (mV) ⁸	93.6	93.0	91.9	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	С	VR mV	Unc (k=2)
10000	cw	0.00	×	0.00	0.00	1.00	300	± 1.5%
			Υ	0.00	0.00	1.00	300	
			z	0.00	0.00	1.00	300	

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

Certificate No: ET3-1644_Nov09

 $^{^{\}rm A}$ The uncertainties of NormX,Y,Z do not affect the ${\rm E}^{\rm A}$ -field uncertainty inside TSL (see Pages 5 and 6).

Numerical linearization parameter: uncertainty not required.

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Andrew Becker	March 15 – March 16, 2010 RTS-2474-1003-24 L6ARCV70UW			

DASY - Parameters of Probe: ET3DV6 SN:1644

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz] ^G	Permittivity	Conductivity	ConvF X Co	nvFY C	onvF Z	Alpha	Depth Unc (k=2)
900	±50/±100	41.5 ± 5%	0.97 ± 5%	6.08	6.08	6.08	0.42	2.29 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	5.17	5.17	5.17	0.61	2.31 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.50	4.50	4.50	0.99	1.61 ± 11.0%

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.

Testing Services™	Appendix D for the BlackBerry® SAR Report	Smartphone Model R	CV72UW	Page 18(41)	
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Andrew Becker	March 15 – March 16, 2010 RTS-2474-1003-24 L6ARCV70UW				

DASY - Parameters of Probe: ET3DV6 SN:1644

Calibration Parameter Determined in Body Tissue Simulating Media

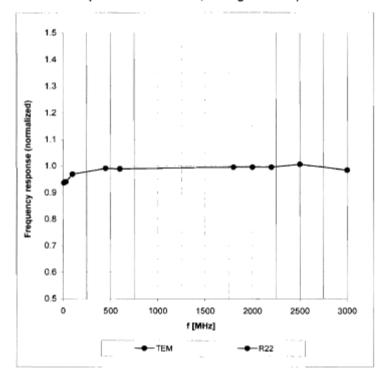
f [MHz]	Validity [MHz] ^C	Permittivity	Conductivity	ConvF X Cor	nvFY Co	nvF Z	Alpha	Depth Unc (k=2)	_
900	±50/±100	$55.0 \pm 5\%$	$1.05 \pm 5\%$	5.87	5.87	5.87	0.41	2.55 ± 11.0%	
1810	±50/±100	$53.3 \pm 5\%$	1.52 ± 5%	4.69	4.69	4.69	0.79	2.57 ± 11.0%	
2450	±50/±100	52.7 ± 5%	1.95 ± 5%	4.11	4.11	4.11	0.99	1.41 ± 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.

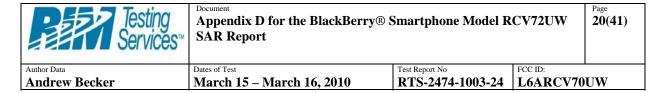
Testing Services™	Appendix D for the BlackBerry® Smartphone Model RCV72UW SAR Report			
Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	March 15 – March 16, 2010	RTS-2474-1003-24	L6ARCV70	UW

Frequency Response of E-Field

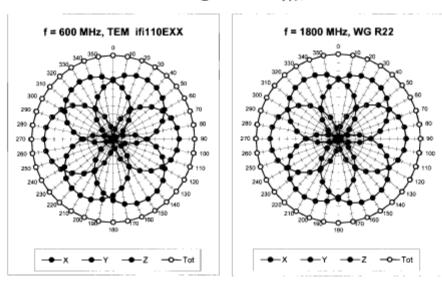
(TEM-Cell:ifi110 EXX, Waveguide: R22)

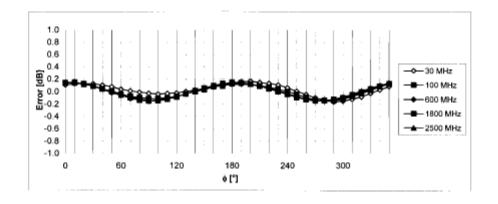


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)



Receiving Pattern (ϕ), ϑ = 0°



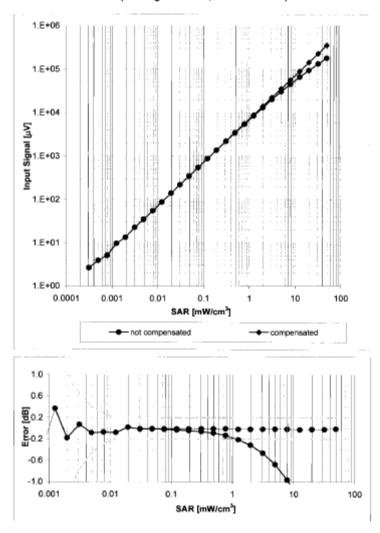


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Testing Services™	Appendix D for the BlackBerry® Smartphone Model RCV72UW SAR Report			
Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	March 15 – March 16, 2010	RTS-2474-1003-24	L6ARCV70	UW

Dynamic Range f(SAR_{head})

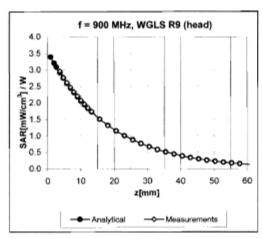
(Waveguide R22, f = 1800 MHz)

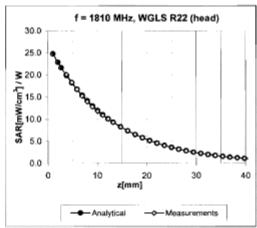


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Testing Services™	Appendix D for the BlackBerry® SAR Report	Smartphone Model R	CV72UW	Page 22(41)
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Andrew Becker	March 15 – March 16, 2010	RTS-2474-1003-24	L6ARCV70	UW

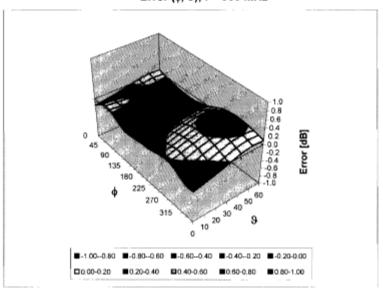
Conversion Factor Assessment



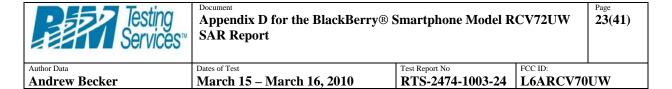


Deviation from Isotropy in HSL

Error (φ, θ), f = 900 MHz



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



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



Appendix D for the BlackBerry $\$ Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

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RTS-2474-1003-24

FCC ID:

L6ARCV70UW

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

lient RTS (RIM Testing Services)

Certificate No: D835V2-446_Jan09

Accreditation No.: SCS 108

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration) Primary Standards ID # Cal Date (Certificate No.) Scheduled Calibration Power meter EPM-442A G837480704 G837480704 G8-Oct-08 (No. 217-00898) Oct-09 Power sensor HP 8481A US37292783 G8-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 Reference Probe ES3DV2 SN: 3025 SR-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 Check Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-07) In house check: Oct-01 Name Function Signature	Object	D835V2 - SN: 44	6	
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This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration) Primary Standards ID # Cal Date (Certificate No.) Scheduled Calibration Power meter 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 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 Check Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-07) In house check: Oct-04 Neme Function Signature	Calibration date:	January 05, 2009		CERTICINA.
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 / 08327 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 Check Power sensor HP 9481A MY41092317 18-Oct-02 (in house check Oct-07) In house check: Oct-01 RF generator R&S SMT-06 100005 4-Aug-99 (in house check Oct-07) In house check: Oct-01 Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-08) In house check: Oct-01	Condition of the calibrated item	In Tolerance		
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ID # Check Date (in house) Scheduled Check	Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator	GB37480704 US37292783 SN: 5086 (20g)	08-Oct-08 (No. 217-00898) 08-Oct-08 (No. 217-00898) 01-Jul-08 (No. 217-00864)	Oct-09 Oct-09 Jul-09
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RF generator R&S SMT-06 100005 4-Aug-99 (in house check Oct-07) In house check: Oct-06 In house check Oct-08 In house check: Oct-06 In house check: Oct-07 In house check: Oct-07 In house check: Oct-07 In house check: Oct-08 In ho	Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV2	GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3025	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)	Oct-09 Oct-09 Jul-09 Jul-09 Apr-09
Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-08) In house check: Oct-08 Name Function Signature	Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV2 DAE4 Secondary Standards	GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3025 SN: 601	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) 14-Mar-08 (No. DAE4-601_Mar08)	Oct-09 Oct-09 Jul-09 Jul-09 Apr-08 Mar-09
Name Function Signature	Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV2 DAE4 Secondary Standards Power sensor HP 8481A	GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3025 SN: 601 ID # MY41092317	08-Oct-08 (No. 217-00898) 08-Oct-08 (No. 217-00898) 01-Jul-08 (No. 217-00894) 01-Jul-08 (No. 217-00867) 28-Apr-08 (No. ES3-3025_Apr08) 14-Mar-08 (No. DAE4-601_Mar08) Check Date (in house)	Oct-09 Oct-09 Jul-09 Jul-09 Jul-09 Apr-09 Mar-09 Scheduled Check In house check: Oct-09
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Calibrated by: Jeton Kastrati Laboratory Technician	Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV2 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3025 SN: 601 ID # MY41092317 100005	08-Oct-08 (No. 217-00898) 08-Oct-08 (No. 217-00898) 01-Jul-08 (No. 217-00864) 01-Jul-08 (No. 217-00864) 01-Jul-08 (No. 217-00867) 28-Apr-08 (No. ES3-3025_Apr08) 14-Mar-08 (No. DAE4-601_Mar08) Check Date (in house) 18-Oct-02 (in house check Oct-07) 4-Aug-99 (in house check Oct-07)	Oct-09 Oct-09 Jul-09 Jul-09 Jul-09 Apr-09 Mar-09 Scheduled Check In house check: Oct-09
	Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV2 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 08327 SN: 601 ID # MY41092317 100005 US37390585 S4206	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) 14-Mar-08 (No. DAE4-601_Mar08) 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)	Oct-09 Oct-09 Jul-09 Jul-09 Jul-09 Apr-09 Mar-09 Scheduled Check In house check: Oct-09 In house check: Oct-09 In house check: Oct-09
Approved by: Katja Pokovic Technical Manager	Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV2 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3025 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name	08-Oct-08 (No. 217-00898) 08-Oct-08 (No. 217-00898) 01-Jul-08 (No. 217-00894) 01-Jul-08 (No. 217-00864) 01-Jul-08 (No. E33-3025_Apr08) 14-Mar-08 (No. E33-3025_Apr08) 14-Mar-08 (No. DAE4-601_Mar08) 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) Function	Oct-09 Oct-09 Jul-09 Jul-09 Jul-09 Apr-09 Mar-09 Scheduled Check In house check: Oct-09 In house check: Oct-09 In house check: Oct-09

Certificate No: D835V2-446_Jan09

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Appendix D for the BlackBerry® Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No

RTS-2474-1003-24

FCC ID:

L6ARCV70UW

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





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S wiss 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.

		_
Certificate No: D835V2-446_Jan09	Page 2 of 6	



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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No RTS-2474-1003-24 FCC ID:

L6ARCV70UW

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 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 cm3 (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)

Certificate No: D835V2-446_Jan09

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



$\label{lem:second-equation} \textbf{Appendix D for the BlackBerry} \& \textbf{Smartphone Model RCV72UW SAR Report}$

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No **RTS-2474-1003-24**

FCC ID:

L6ARCV70UW

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

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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Appendix D for the BlackBerry® Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

March 15 - March 16, 2010

Test Report No

RTS-2474-1003-24 | I

FCC ID:

L6ARCV70UW

DASY5 Validation Report for Head TSL

Date/Time: 05.01.2009 10:38:06

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; $\sigma = 0.91$ mho/m; $\varepsilon_r = 41.1$; $\rho = 1000$ 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,

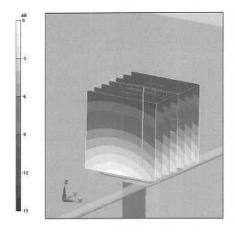
dy=5mm, dz=5mm

Reference Value = 55.7 V/m; Power Drift = 0.024 dB

Peak SAR (extrapolated) = 3.54 W/kg

SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.58 mW/g

Maximum value of SAR (measured) = 2.7 mW/g



0 dB = 2.7 mW/g

Certificate No: D835V2-446_Jan09

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Appendix D for the BlackBerry $\$ Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

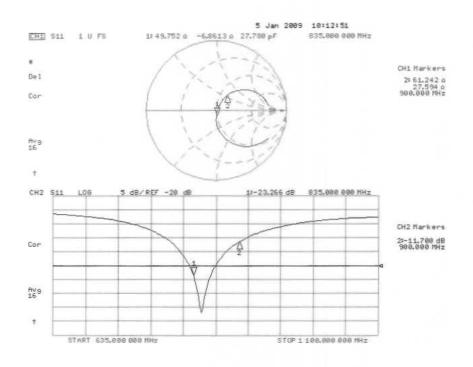
March 15 – March 16, 2010

Test Report No **RTS-2474-1003-24**

FCC ID:

L6ARCV70UW

Impedance Measurement Plot for Head TSL



Certificate No: D835V2-446_Jan09

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Appendix D for the BlackBerry $\$ Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No RTS-2474-1003-24 FCC ID:

L6ARCV70UW

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





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

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Client

RTS (RIM Testing Services)

Certificate No: D1900V2-545-Jan09

Accreditation No.: SCS 108

Object	D1900V2 - SN: 5	45	
Calibration procedure(s)	QA CAL-05.v7 Calibration proce	dure for dipole validation kits	
Calibration date:	January 06, 2009		
Condition of the calibrated item	In Tolerance		\$13.5mp
Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A	TE critical for calibration) ID # GB37480704 US37292783	Cat Date (Calibrated by, Certificate No.) 08-Oct-08 (No. 217-00898) 08-Oct-08 (No. 217-00898)	Scheduled Calibration Oct-09 Oct-09
Primary Standards Power meter EPM-442A	ID # GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V2 DAE4	ID # GB37480704 US37292783 SN: 5085 (20g) SN: 5047.2 / 06327 SN: 3025 SN: 601	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) 14-Mar-08 (No. DAE4-601_Mar08)	Oct-09 Oct-09 Jul-09 Jul-09 Apr-09 Mar-09
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: 5085 (20g) SN: 5047.2 / 06327 SN: 3025	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)	Oct-09 Oct-09 Jul-09 Jul-09 Apr-09
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV2 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3025 SN: 601 ID # MY41092317 100005 US37390585 S4206	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) 14-Mar-08 (No. DAE4-601_Mar-08) 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)	Oct-09 Oct-09 Jul-09 Jul-09 Apr-09 Mar-09 Scheduled Check In house check: Oct-09 In house check: Oct-09
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V2 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3025 SN: 601 ID # MY41092317 100005 US37390585 S4206	08-Oct-06 (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) 14-Mar-08 (No. DAE4-601_Mar08) 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)	Oct-09 Oct-09 Jul-09 Jul-09 Apr-09 Mar-09 Scheduled Check In house check: Oct-09 In house check: Oct-09 In house check: Oct-09

Certificate No: D1900V2-545_Jan09

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Appendix D for the BlackBerry® Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No RTS-2474-1003-24 FCC ID:

L6ARCV70UW

Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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Servicio 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:

- 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.

Certificate No: D1900V2-545 Jan09



Appendix D for the BlackBerry $\$ Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No RTS-2474-1003-24

FCC ID:

L6ARCV70UW

Measurement Conditions

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

DASY5	V5.0
Advanced Extrapolation	
Modular Flat Phantom V5.0	
10 mm	with Spacer
dx, dy, dz = 5 mm	
1900 MHz ± 1 MHz	
	Advanced Extrapolation Modular Flat Phantom V5.0 10 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	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 ¹ (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"



Appendix D for the BlackBerry $\$ Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

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FCC ID:

L6ARCV70UW

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



Appendix D for the BlackBerry® Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No RTS-2474-1003-24

FCC ID:

L6ARCV70UW

DASY5 Validation Report for Head TSL

Date/Time: 06.01.2009 13:17:58

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)

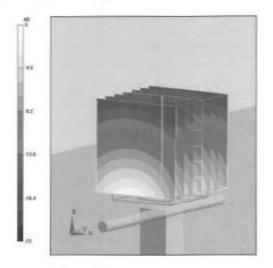
(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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 = 12mW/g



Appendix D for the BlackBerry $\mbox{\ensuremath{\mathbb{R}}}$ Smartphone Model RCV72UW SAR Report

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Author Data
Andrew Becker

Dates of Test

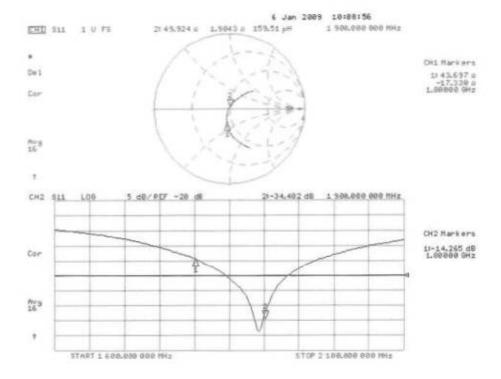
March 15 – March 16, 2010

Test Report No **RTS-2474-1003-24**

FCC ID:

L6ARCV70UW

Impedance Measurement Plot for Head TSL





Appendix D for the BlackBerry® Smartphone Model RCV72UW **SAR Report**

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Author Data **Andrew Becker** Dates of Test

March 15 – March 16, 2010

Test Report No

RTS-2474-1003-24

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Accreditation No.: SCS 108

FCC ID: L6ARCV70UW

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





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Client

RTS (RIM Testing Services)

Certificate No: D2450V2-747_Nov09

CALIBRATION CERTIFICAT D2450V2 - SN: 747 Object Calibration procedure(s) QA CAL-05.V7 Calibration procedure for dipole validation kits Calibration date: November 11, 2009 This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration) Scheduled Calibration Primary Standards Cal Date (Certificate No.) Power meter EPM-442A GB37480704 06-Oct-09 (No. 217-01086) Oct-10 Power sensor HP 8481A US37292783 06-Oct-09 (No. 217-01086) Oct-10 Mar-10 Reference 20 dB Attenuator SN: 5086 (20g) 31-Mar-09 (No. 217-01025) Type-N mismatch combination SN: 5047.2 / 06327 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-06 100005 4-Aug-99 (in house check Oct-09) In house check: Oct-11 Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-09) In house check: Oct-10 Name Function Calibrated by: Approved by: Issued: November 16, 2009 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: D2450V2-747_Nov09

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Author Data
Andrew Becker

Dates of Test

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Test Report No

RTS-2474-1003-24

FCC ID:

L6ARCV70UW

Calibration Laboratory of

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





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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.

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Appendix D for the BlackBerry® Smartphone Model RCV72UW **SAR Report**

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Dates of Test Author Data **Andrew Becker**

Test Report No FCC ID: L6ARCV70UW March 15 – March 16, 2010 RTS-2474-1003-24

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	
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 mha/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 cm3 (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)

Certificate No: D2450V2-747_Nov09



Appendix D for the BlackBerry® Smartphone Model RCV72UW

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Author Data
Andrew Becker

Dates of Test

March 15 – March 16, 2010

Test Report No **RTS-2474-1003-24**

FCC ID:

L6ARCV70UW

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

Certificate No: D2450V2-747_Nov09



Appendix D for the BlackBerry® Smartphone Model RCV72UW **SAR Report**

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Author Data **Andrew Becker** Dates of Test

March 15 – March 16, 2010

Test Report No RTS-2474-1003-24

FCC ID: L6ARCV70UW

DASY5 Validation Report for Head TSL

Date/Time: 11.11.2009 15:04:10

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; $\sigma = 1.79 \text{ mho/m}$; $\varepsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: ES3DV3 - SN3205; ConvF(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:

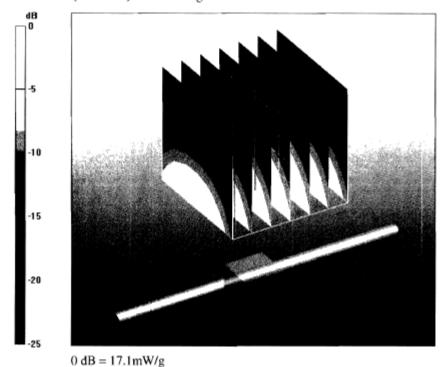
Measurement grid: dx=5mm, dy=5mm, dz=5mm

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



Certificate No: D2450V2-747_Nov09



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Author Data

Andrew Becker

Dates of Test

March 1

March 15 – March 16, 2010

Test Report No **RTS-2474-1003-24**

FCC ID:

L6ARCV70UW

Impedance Measurement Plot for Head TSL

