RTS RIM Testing Services	Document Appendix for the BlackBerr SAR Report	y® Smartphone Model	RBS21CW	Page 1(22)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	Aug. 13–22, 2007 RTS-0736-0708-09 L6ARBS20CV			

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

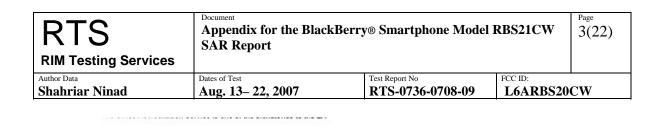
Document Appendix for the BlackBerry® Smartphone Model RBS21CW SAR Report					
Dates of Test	Test Report No	FCC ID:			
Aug. 13–22, 2007	RTS-0736-0708-09	L6ARBS20CW			
Zurich, Switzerland	C Service suisse of Servize svizzerv S Swiss Calibratio	"étalonnage o di taratura n Service			
	SAR Report Dates of Test Aug. 13– 22, 2007 atory of	SAR Report         Dates of Test         Aug. 13-22, 2007         Test Report No         RTS-0736-0708-09         atory of         Zurich, Switzerland         weral Office of Metrology and Accreditation         Accreditation No.: SCS 108			

Contraction of the contraction of the			
CALIBRATION	CERTIFICAT	ΓE	
Object	ET3DV6 - SN:1	642	
Calibration procedure(s)	QA CAL-01.v5 Calibration proc	edure for dosimetric E-field probes	
Calibration date:	January 15, 200	07	
Condition of the calibrated item	In Tolerance		
All calibrations have been condu Calibration Equipment used (M&		ory facility: environment temperature (22 $\pm$ 3)°C and	d humidity < 70%.
Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
minary outroates		5-Apr-06 (METAS, No. 251-00557)	
Power meter E4419B	GB41293874	or spir of the tries, they are a county	Apr-07
Power meter E4419B Power sensor E4412A	MY41495277	5-Apr-06 (METAS, No. 251-00557)	Apr-07 Apr-07
Power meter E4419B Power sensor E4412A Power sensor E4412A	MY41495277 MY41498087	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557)	Apr-07 Apr-07
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 cB Attenuator	MY41495277 MY41498087 SN: S5054 (3c)	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592)	Apr-07 Apr-07 Aug-07
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 cB Attenuator Reference 20 dB Attenuator	MY41495277 MY41498087 SN: 85054 (3c) SN: 85086 (20b)	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Apr-06 (METAS, No. 251-00558)	Apr-07 Apr-07 Aug-07 Apr-07
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 c8 Attenuator Reference 20 d8 Attenuator Reference 20 d8 Attenuator	MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b)	5-Apr-08 (METAS, No. 251-00557) 5-Apr-08 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Apr-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 217-00593)	Apr-07 Apr-07 Aug-07 Apr-07 Aug-07
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 c8 Attenuator Reference 20 dB Attenuator Reference 30 dB Attenuator Reference Probe ES3DV2	MY41495277 MY41498087 SN: 85054 (3c) SN: 85086 (20b)	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Apr-06 (METAS, No. 251-00558)	Apr-07 Apr-07 Aug-07 Apr-07
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 cB Attenuator Reference 20 dB Attenuator Reference 30 dB Attenuator Reference Prube ES30V2 DAE4	MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 3013	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Apr-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 217-00593) 4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Apr-07 Apr-07 Aug-07 Aug-07 Jan-08
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 c8 Attenuator Reference 30 d8 Attenuator Reference 20 d8 Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards RF generator HP 8648C	MY41495277 MY41498087 SN: S5054 (3c) SN: S5029 (30b) SN: S5129 (30b) SN: 3013 SN: 654 ID # US3642U01700	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 251-00559) 4-Apr-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 251-005693) 4-Jan-07 (SPEAG, No. ES3-3013_Jan07) 21-Jun-06 (SPEAG, No. DAE4-854_Jun06) Check Date (in house) 4-Aug-99 (SPEAG, in house check Nov-05)	Apr-07 Apr-07 Aug-07 Aug-07 Aug-07 Jan-08 Jun-07
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 c8 Attenuator Reference 30 d8 Attenuator Reference 20 d8 Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards RF generator HP 8648C	MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 3013 SN: 654 ID #	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Apr-06 (METAS, No. 217-00593) 10-Aug-06 (METAS, No. 251-00593) 4-Jan-07 (SPEAG, No. ES3-3013_Jan07) 21-Jun-06 (SPEAG, No. DAE4-654_Jun06) Check Date (in house)	Apr-07 Apr-07 Aug-07 Aug-07 Jan-08 Jun-07 Scheduled Check
Power meter E44198 Power sensor E4412A Power sensor E4412A Reference 2: 08 Attenuator Reference 2: 08 Attenuator Reference 2: 08 Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards RF generator HP 8648C Network Analyzer HP 6753E	MY41495277 MY41498087 SN: 85054 (3c) SN: 85054 (3c) SN: 85129 (30b) SN: 85129 (30b) SN: 85129 (30b) SN: 654 ID # US3642U01700 US37390585 Name	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 251-00593) 4-Jan-07 (SPEAG, No. 253-3013, Jan07) 21-Jun-06 (SPEAG, No. DAE4-654_Jun08) Check Date (in house) 4-Aug-99 (SPEAG, in house check Nov-05) 18-Oct-01 (SPEAG, in house check Oct-06) Function	Apr-07 Apr-07 Aug-07 Aug-07 Jan-08 Jun-07 Scheduled Check In house check: Nov-07
Power meter E44198 Power sensor E4412A Power sensor E4412A Reference 2: 08 Attenuator Reference 2: 08 Attenuator Reference 2: 08 Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards RF generator HP 8648C Network Analyzer HP 6753E	MY41495277 MY41498087 SN: 85054 (3c) SN: 85084 (3c) SN: 85129 (30b) SN: 85129 (30b) SN: 65129 (30b) SN: 654 ID # U\$3642U01700 U\$37360585	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 251-00552) 4-Apr-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 251-00563) 4-Jan-07 (SPEAG, No. 237-00563) 21-Jun-06 (SPEAG, No. 233-0313_Jan07) 21-Jun-06 (SPEAG, No. DAE4-854_Jun08) Check Date (in house) 4-Aug-99 (SPEAG, in house check Nov-05) 18-Oct-01 (SPEAG, in house check Oct-06)	Apr-07 Apr-07 Aug-07 Aug-07 Jan-08 Jun-07 Scheduled Check In house check: Nov-07 In house check; Oct-07
Power meter E44198 Power sensor E4412A Power sensor E4412A Reference 3 cB Attenuator Reference 20 dB Attenuator Reference 20 dB Attenuator Reference Probe ES30V2 DAE4 Secondary Standards RF generator HP 8648C Network Analyzer HP 8753E Calibrated by	MY41495277 MY41498087 SN: 85054 (3c) SN: 85054 (3c) SN: 85129 (30b) SN: 85129 (30b) SN: 85129 (30b) SN: 654 ID # US3642U01700 US37390585 Name	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 251-00593) 4-Jan-07 (SPEAG, No. 253-3013, Jan07) 21-Jun-06 (SPEAG, No. DAE4-654_Jun08) Check Date (in house) 4-Aug-99 (SPEAG, in house check Nov-05) 18-Oct-01 (SPEAG, in house check Oct-06) Function	Apr-07 Apr-07 Aug-07 Aug-07 Jan-08 Jun-07 Scheduled Check In house check: Nov-07 In house check; Oct-07
Power meter E44199 Power sensor E4412A Power sensor E4412A Power sensor E4412A Reference 3 c8 Altenuator Reference 20 d8 Attenuator Reference 20 d8 Attenuator Reference 20 d8 Attenuator Reference Probe ES30V2 DAE4 Secondary Standards RF generator HP 8648C Network Analyzer HP 8753E Calibrated by:	MY41495277 MY41498087 SN: S5054 (3c) SN: S5029 (30b) SN: S5129 (30b) SN: S5129 (30b) SN: 654 ID # US3642U01700 US3642U01700 US37390585 Name Katja Pokovic	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Apr-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 251-00593) 4-Jan-07 (SPEAG, No. ES3-3013_Jan07) 21-Jun-06 (SPEAG, No. ES3-3013_Jan07) 21-Jun-06 (SPEAG, No. DAE4-654_Jun06) Check Date (in house) 4-Aug-99 (SPEAG, in house check Nov-05) 18-Oct-01 (SPEAG, in house check Nov-05) Function Technical Manager	Apr-07 Apr-07 Aug-07 Jan-08 Jan-08 Jun-07 Scheduled Check In house check: Nov-07 In house check; Oct-07

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



Schweizerischer Kalibrierdienst s Service suisse d'étalonnage С s

- Servizio svizzero di taratura
- Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Federal Office of Metrology and Accreditation 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	0
· · ·	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization $\phi$	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
- 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

#### 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 E<sup>2</sup>-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 (no uncertainty required). DCP does not depend on frequency nor media.
- 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: ET3-1642\_Jan07

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Shahriar Ninad	Aug. 13–22, 2007         RTS-0736-0708-09         L6ARBS20C			

January 15, 2007

# Probe ET3DV6

# SN:1642

Manufactured: November 7, 2001 Last calibrated: January 19, 2006 Recalibrated: January 15, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

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#### January 15, 2007

### DASY - Parameters of Probe: ET3DV6 SN:1642

Sensitivity in F	ree Space	e <sup>A</sup>		Diode	Compression <sup>B</sup>
NormX	1.6	9 ± 10.1%	μV/(V/m) <sup>2</sup>	DCP X	94 mV
NormY	1.8	6 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	96 mV
NormZ	1.6	<b>2</b> ± 10.1%	$\mu V/(V/m)^2$	DCP Z	95 mV
Sensitivity in T	issue Sim	ulating Li	quid (Conver	sion Factor	s)
Please see Page 8.					
Boundary Effe	ct				
TSL	900 MHz	Typical SA	AR gradient: 5 %	per mm	
Sensor Cen	ter to Phanto	m Surface Di	stance	3.7 mm	4.7 mm
SAR <sub>be</sub> [%]	Without	Correction A	lgorithm	5.5	2.5
SAR <sub>50</sub> [%]	With Co	rrection Algo	rithm	0.3	0.2
TSL	1810 MHz	Typical SA	AR gradient: 10 %	per mm	
Sensor Cen	ter to Phanto	m Surface Di	stance	3.7 mm	4.7 mm
SAR <sub>be</sub> [%]	Without	Correction A	lgorithm	12.3	8.1
SAR <sub>be</sub> [%]	With Co	rrection Algo	rithm	0.6	0.3
Sensor Offset					
Probe Tip to	Sensor Cen	ter		2.7 mm	
The reported unc measurement mu corresponds to a	Itiplied by t	the coverage	ge factor k=2, w	hich for a nor	
<sup>A</sup> The uncertainties of Norr <sup>8</sup> Numerical linearization p				(see Page 8).	

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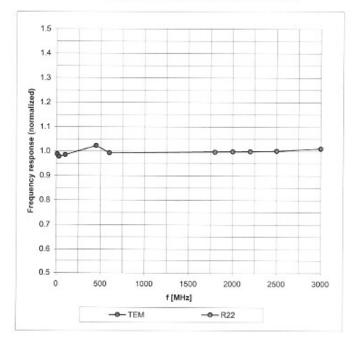
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RTS RIM Testing Services	Document Appendix for the BlackBerry® Smartphone Model RBS21CW SAR Report				
Author Data	Dates of Test	Test Report No	FCC ID:		
Shahriar Ninad	Aug. 13– 22, 2007	RTS-0736-0708-09	L6ARBS20	CW	

January 15, 2007

# Frequency Response of E-Field

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



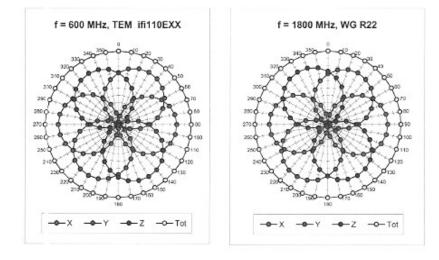
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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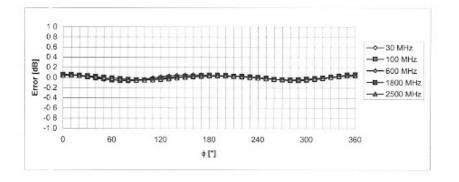
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Author Data	Dates of Test	Test Report No	FCC ID:		
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January 15, 2007



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



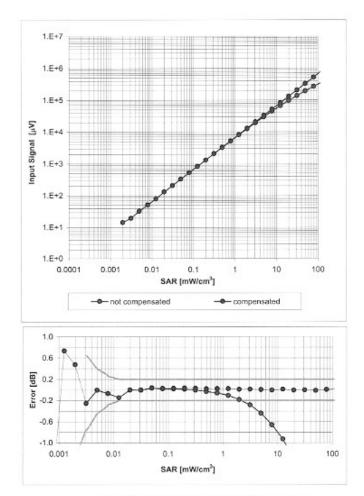
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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January 15, 2007



# Dynamic Range f(SAR<sub>head</sub>)

(Waveguide R22, f = 1800 MHz)

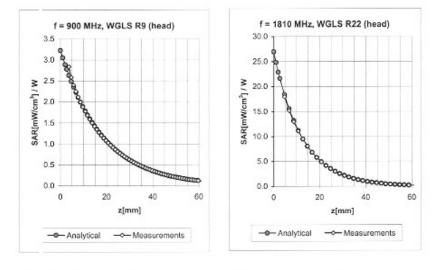
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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January 15, 2007



## **Conversion Factor Assessment**

f [MHz]	Validity [MHz] <sup>C</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.31	2.70	6.41 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.56	2.48	5.28 ± 11.0% (k=2)

900	± 50 / ± 100	Body	55.0 ± 5%	$1.05 \pm 5\%$	0.33	2.72	6.16	± 11.0% (k=2)
1810	± 50 / ± 100	Body	$53.3\pm5\%$	1.52 ± 5%	0.65	2.61	4.78	± 11.0% (k=2)

<sup>C</sup> 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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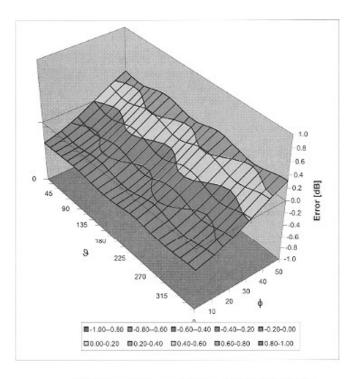
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RTS RIM Testing Services	Document Appendix for the Black SAR Report	Berry® Smartphone Mode	RBS21CW	Page 10(22)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	Aug. 13– 22, 2007	RTS-0736-0708-09	L6ARBS20	CW

January 15, 2007

# **Deviation from Isotropy in HSL**

Error (o, 3), f = 900 MHz



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

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esting Services	Appendix for th SAR Report	e BlackBerry® Smart	phone Model	RBS21CW 1
r Ninad	Dates of Test Aug. 13– 22, 200	Test Report N RTS-07	。 36-0708-09	FCC ID: L6ARBS20CV
Calibration Laborat Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zu		IBC-MEA SHISS	C Service suise Servizio sviz S Swiss Calibr	
Accredited by the Swiss Feder The Swiss Accreditation Ser Multilateral Agreement for th	vice is one of the signatorie	is to the EA	ditation No.: SCS 1	08
Client RIM	the the set of	Certifi	cate No: D835V2-4	46_Jan07
CALIBRATION	CERTIFICATE			
Object	D835V2 - SN: 44	6		
Calibration procedure(s)	QA CAL-05.v6	and the second second		
	Calibration proce	dure for dipole validation kil	is	
Calibration date:	January 8, 2007			
Contractor Caste	January 0, 2001	a hatta a the second	S. S. S. S. A. TES	
Condition of the calibrated iter				
Condition of the calibrated iter This calibration certificate doo	In Tolerance	onsi standards, which realize the phys		
Condition of the calibrated iter This calibration certificate doo The measurements and the un	In Tolerance	robability are given on the following pa	iges and are part of the	certificate.
Condition of the calibrated iter This calibration certificate doo The measurements and the un	n In Tolerance		iges and are part of the	certificate.
Condition of the calibrated iter This calibration certificate doo The measurements and the ur All calibrations have been con	n In Tolerance	robability are given on the following pa	iges and are part of the 2 ± 3)°C and humidity <	certificate.
Condition of the calibrated iter This calibration certificate doo The measurements and the un All calibrations have been con Calibration Equipment used (I Primary Standards Power motor EPM-442A	In Tolerance	robability are given on the following pa y facility: environment temperature (2 Cal Date (Calibrated by, Certificate 03-Oct-06 (METAS, No. 217-00608	iges and are part of the 2 ± 3)°C and humidity < No.) Schedule () Oct-07	certificate. 70%.
Condition of the calibrated iter This calibration certificate doo The measurements and the ur All calibrations have been con Calibration Equipment used (h Primary Standards Power motor EPM-442A Power sensor HP 8481A	In Tolerance	robability are given on the following pa ty facility: environment temperature (2) Cal Date (Calibrated by, Certificate 03-Det-06 (METAS, No. 217-00608 03-Oct-06 (METAS, No. 217-00608	iges and are part of the 2 ± 3)°C and humidity < No.) Schedule ) Oct-07 ) Oct-07	certificate. 70%.
Condition of the calibrated iter This calibration certificate doo The measurements and the ur All calibrations have been con Calibration Equipment used (f Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator	In Tolerance	Cal Date (Calibrated by, Certificate 03-Oct-06 (METAS, No. 217-00606 03-Oct-06 (METAS, No. 217-00606 10-Aug-06 (METAS, No. 217-00591	Iges and are part of the 2 ± 3)*C and humidity < No.) Schedule ) Oct-07 ) Oct-07 ) Aug-07	certificate. 70%.
Condition of the calibrated iter This calibration certificate doo The measurements and the ur All calibrations have been con Calibration Equipment used (h Primary Standards Power motor EPM-442A Power sensor HP 8481A	In Tolerance	robability are given on the following pa ty facility: environment temperature (2) Cal Date (Calibrated by, Certificate 03-Det-06 (METAS, No. 217-00608 03-Oct-06 (METAS, No. 217-00608	Iges and are part of the           2 ± 3)*C and humidity            No.)         Schedule           0)         Oct-07           0)         Oct-07           0)         Oct-07           0)         Aug-07           0)         Aug-07	certificate. 70%.
Condition of the calibrated iter This calibration certificate doo The measurements and the ur All calibrations have been con Calibration Equipment used (f Primary Standards Powor meter EPV-442A Powor sensor HP 8481A Reference 20 dB Attenuator Reference 10 dB Attenuator	In Tolerance	Cal Date (Calibrated by, Certificate 03-Oct-06 (METAS, No. 217-00606 03-Oct-06 (METAS, No. 217-00606 10-Aug-06 (METAS, No. 217-00591 10-Aug-06 (METAS, No. 217-00591	liges and are part of the           2 ± 3)*C and humidity            No.)         Schedule           0)         Oct-07           0)         Oct-07           0)         Aug-07           0)         Aug-07           0)         Oct-07	certificate. 70%.
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



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S Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Federal Office of Metrology and Accreditation 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 System Handbook

#### Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the enc 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: D835V2-445\_Jan07

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### Measurement Conditions

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

DASY Version	DASY4	V4.7
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	

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Head TSL parameters The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) *C	40.2±6%	0.88 mho/m ± 6 %
Head TSL temperature during test	(22.2 ± 0.2) °C		-

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.33 mW / g
SAR normalized	normalized to 1W	9.32 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	9.28 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	253 mW input power	1.52 mW / g
SAR normalized	normalized to 1W	6.08 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	6.04 mW/g±16.5 % (k=2)

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

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Shahriar Ninad	Aug. 13– 22, 2007	RTS-0736-0708-09	L6ARBS20	CW

#### Appendix

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.8 Ω - 5.8 jΩ
Return Loss	- 24.7 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 ns	
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

feedpoint may be damaged.

#### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 24, 2001

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#### DASY4 Validation Report for Head TSL

Date/Time: 08.01.2007 11:34:46

Test Laboratory: SPEAG, Zurich, Switzerland

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

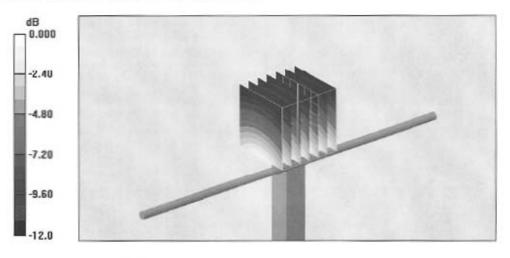
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1 Medium: HSL 900 MHz; Medium parameters used: f = 835 MHz;  $\sigma$  = 0.88 mho/m;  $\epsilon_r$  = 40.3;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 20.07.2006
- · Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Reference Value = 55.7 V/m; Power Drift = 0.017 dB Peak SAR (extrapolated) = 3.43 W/kg SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.52 mW/g Maximum value of SAR (measured) = 2.51 mW/g



0 dB = 2.51mW/g

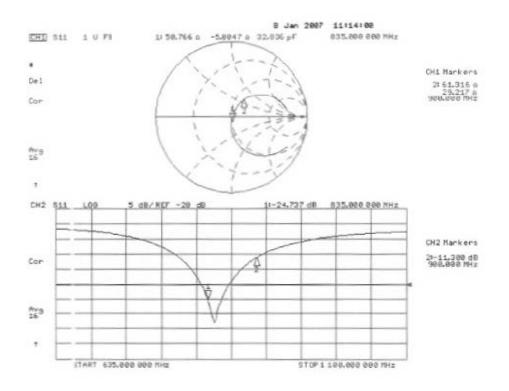
Certificate No: D835V2-446\_Jan07

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#### Impedance Measurement Plot for Head TSL

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Certificate No: D835V2-446\_Jan07

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ar Ninad     Date of Test Aug. 13-22, 2007     Tork Report No RTS-0736-0708-09     PCC ID: LGARBS20CX       Calibration Laboratory of Schmid & Partner Engineering AG Engineering AG					
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Object         D1900V2 - SN: 545           Calibration procedure(s)         QA CAL-05.v6 Calibration procedure for dipole validation kits           Calibration data:         January 9, 2007           Condition of the calibrated law         In Tolerance           This calibration carifficate documents the toxoability to national standards, which realize the physical units of measurements (S). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.           All calibrations is use been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.	Client RIM		Certificate No: [	01900V2-545_Jan07	
Calibration procedure(s)       QA CAL-05.v6 Calibration procedure for dipole validation kits         Calibration date:       January 9, 2007         Condition of the calibrated law       In Tolerance         The calibration certificate documents the troosebility to national standards, which realize the physical units of measurements (S). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate and the uncertainties with confidence probability are given on the following pages and are part of the certificate.         All calibration laws been conducted in the closed laboratory facility: environment temporature (22 ± 3)°C and humidity < 70%.	CALIBRATION	CERTIFICATE	Service States and		
Calibration procedure for dipole validation kits         Calibration date:       January 9, 2007         Condition of the calibrated item       In Tolerance         This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (S). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.         All calibration Equipment used (M&TE ortical for calibration facility: environment temperature (22.1.3)*C and humidity < 70%.	Object	D1900V2 - SN: 5	45	12. 1. S. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	
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Reference 10 dB Attenuator Reference Probe ET3DV6     SN: 5047.2 (10r)     10-Aug-06 (METAS, No 217-00601)     Aug-07       Reference Probe ET3DV6     SN: 1507     19-Oct-06 (SPEAG, No. ET3-1607_Oct06)     Oct-07       Reference Probe ES3DV3     SN: 3025     19-Oct-06 (SPEAG, No. ES3-3025_Oct06)     Oct-07       DAE4     SN 907     20-Jul-06 (SPEAG, No. ES3-3025_Oct06)     Oct-07       Secondary Standards     ID #     Check Date (in house)     Schedulad Check       Power sensor HP 8481A     MY41092317     18-Oct-02 (SPEAG, in house check Not-05)     In house check: Oct-07       RF generator Agi ent E4421B     MY41000875     11-May-06 (SPEAG, in house check Not-05)     In house check: Oct-07       Network Analyzer HP 8753E     US37390585 S4206     18-Oct-01 (SPEAG, in house check Oct-06)     In house check: Oct-07       Calibrated by:     Name     Function     Signature       Calibrated by:     Maxe Melli     Liborationy Technician     M_H_L_L_L_L_L_L_L_L_L_L_L_L_L_L_L_L_L_L_	This calibration certificate do			re part of the certificate.	
Reference Probe ET3DV6     SN: 1507     19-Oct-06 (SPEAG, No. ET3-1607_Oct06)     Oct-07       Reference Probe ES3DV3     SN: 3025     19-Oct-06 (SPEAG, No. ES3-3025_Oct06)     Oct-07       DAE4     SN 907     20-Ju-06 (SPEAG, No. ES3-3025_Oct06)     Ju-07       Secondary Standards     ID #     Check Date (in house)     Scheduled Check       Power stantor HP 8481A     MY41092317     18-Oct-02 (SPEAG, in house check Oct-05)     In house check: Oct-07       RF generator Agi ent E44218     MY41090575     11-May-05 (SPEAG, in house check Oct-06)     In house check: Nov-07       Network Analyzer HP 8753E     MY41090575     18-Oct-01 (SPEAG, in house check Oct-06)     In house check: Oct-07       Calibrated by:     Name     Function     Signature       Calibrated by:     Katja Pokovic     Technical Manager     Multi-Melli       Approved by:     Katja Pokovic     Technical Manager     Multi-Melli	All calibrations have been or Calibration Equipment used Primary Standards Power meter EPM-442A	M&TE oritical for calibration)	Cal Date (Calibrated by, Certificate No.) 03-Oct-08 (METAS, No. 217-00608)	Scheduled Calibration	
DAE4     SN 907     20-JuHo8 (SPEAG, No. DAE4-907_Jul08)     JuHo7       Secondary Standards     ID #     Check Date (in house)     Scheduled Check       Power sensor HP 8481A RF generator Agi ert E44218     MY41092317     18-Oct-02 (SPEAG, in house check Oct-05)     In house check: Oct-07       Network Analyzer HP 8753E     MY41000575     11-May-06 (SPEAG, in house check Oct-06)     In house check: Oct-07       Name     Function     Signature       Calibrated by:     Miae Melli     Laboratory Technician       Approved by:     Katja Pokovic     Technical Manager	All calibrations have been or Calibration Equipment used Primary Standards Power meter EPM-442A Power sensor HP 8451A Reference 20 dB Attenuator	(M&TE ortical for calibration) ID # GB37450704 US37292783 SN: 5086 (20g)	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00808) 03-Oct-06 (METAS, No. 217-00808) 10-Aug-06 (METAS, No. 217-00591)	Scheduled Calibration Oct-07 Oct-07 Aug-07	
Power sensor HP 8481A     MY41092317     18-Oct-02 (SPEAG, in house check Oct-05)     In house check: Oct-07       RF generator Agi ent E4421B     MY41090875     11-May-05 (SPEAG, in house check Nov-05)     In house check: Nov-07       Network Analyzer HP 8753E     US37390565 S4200     18-Oct-01 (SPEAG, in house check Oct-06)     In house check: Nov-07       Calibrated by:     Name     Function     Signature       Calibrated by:     Mike Melli     Laboratory Technician     H. H. H. H.       Approved by:     Katja Pokovic     Technical Manager     Missued: January 16, 2007	All calibrations have been or Calibration Equipment used Primary Standards Power meter EPM-442A Power sensor HP 8451A Reference 20 B Attenuator Reference 910 db Attenuator Reference Probe ET3DV6	M&TE ortical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 (10r) SN: 1507	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00808) 03-Oct-06 (METAS, No. 217-00808) 10-Aug-06 (METAS, No. 217-00591) 10-Aug-06 (METAS, No. 217-00591) 19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Scheduled Calibration Oct-07 Oct-07 Aug-07 Aug-07 Oct-07	
RF generator Agi ent E4421B Network Analyzer HP 8753E     MY41000675 US37390585 S4208     11-May-05 (SPEAG, in house check Nov-05) 18-Oct-01 (SPEAG, in house check Nov-05)     In house check: Nov-07 In house check: Oct-07       Calibrated by:     Name     Function     Signature       Calibrated by:     Mike Melli     Laboratory Technician     M.H.H.H.H.H.H.H.H.H.H.H.H.H.H.H.H.H.H.H	All calibrations have been or Calibration Equipment used Primary Standards Power meter EPM-442A Power sensor HP 8451A Reference 20 dB Attenuator Reference Probe ET3DV6 Reference Probe ET3DV6	M&TE ortical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 (10r) SN: 1507 SN: 3025	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608) 10-Aug-06 (METAS, No 217-00591) 10-Aug-06 (METAS, No 217-00591) 10-Oct-06 (SPEAG, No. ET3-1607_Oct06) 19-Oct-06 (SPEAG, No. ET3-1607_Oct06)	Scheduled Calibration Oct-07 Oct-07 Aug-07 Aug-07 Oct-07 Oct-07 Oct-07	
Calibrated by: Mike Melli Laboratory Technician H.	All calibrations have been or Calibration Equipment used Primary Standards Power meter EP:M-442A Power sensor HP 8481A Reference 20 dB Attenuator Reference 9robs ET3DV6 Reference Probs ET3DV6	M&TE ortical for calibration) ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047.2 (10r) SN: 1507 SN: 1507 SN: 3025 SN 907 ID #	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608) 10-Aug-06 (METAS, No. 217-00591) 10-Aug-06 (METAS, No. 217-00591) 10-Oct-06 (SPEAG, No. ET3-1607_Oct06) 19-Oct-06 (SPEAG, No. ET3-1607_Oct06) 20-Jul-06 (SPEAG, No. DAE4-907_sul05) Check Date (in house)	Scheduled Calibration Oct-07 Oct-07 Aug-07 Aug-07 Oct-07 Oct-07 Oct-07 Scheduled Check	
Issued: January 16, 2007	All calibrations have been or Calibration Equipment used Primary Standards Power meter EPM-442A Power stensor HP 8451A Reference 20 dB Attenuator Reference Probe ET3DV0 Reference Probe ET3DV0 Reference Probe ET3DV0 DAE4 Secondary Standards Power sensor HP 8451A RF generator Agi ent E44211	M&TE ortical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 (10r) SN: 1007 SN: 3025 SN 907 ID # MY41092317 8 MY41000575	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00806) 03-Oct-06 (METAS, No. 217-00591) 10-Aug-06 (METAS, No. 217-00591) 10-Oct-06 (SPEAG, No. ET3-1507_Oct06) 19-Oct-06 (SPEAG, No. ET3-1507_Oct06) 19-Oct-06 (SPEAG, No. DA54-907_aul06) Check Date (in house) 18-Oct-02 (SPEAG, in house check Oct-05) 11-May-05 (SPEAG, in house check Nor-05)	Scheduled Calibration Oct-07 Aug-07 Aug-07 Oct-07 Oct-07 Oct-07 Oct-07 Jul-07 Scheduled Check In house check: Oct-07 In house check: Nov-07	
Issued: January 16, 2007	All calibrations have been or Calibration Equipment used Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Reference Probe ET3DV6 Reference Probe ET3DV6 Reference Probe ET3DV5 DAE4 Secondary Standards Power sensor HP 8481A RF generator Agi ent E4421 Network Analyzer HP 8753E	M&TE ortical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 (10r) SN: 1007 SN: 3025 SN 907 ID # MY41092317 MY41090875 US37390585 S4206 Name	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00806) 03-Oct-06 (METAS, No. 217-00806) 10-Aug-06 (METAS, No. 217-00591) 10-Aug-06 (METAS, No. 217-00591) 10-Oct-06 (SPEAG, No. E33-3025_Oct06) 19-Oct-06 (SPEAG, No. E33-3025_Oct06) 20-Jul-06 (SPEAG, No. DAE4-907_str06) Check Date (in house) 18-Oct-02 (SPEAG, in house check Oct-06) 11-May-05 (SPEAG, in house check Oct-06) 18-Oct-01 (SPEAG, in house check Oct-06) 18-Oct-01 (SPEAG, in house check Oct-06)	Scheduled Calibration Oct-07 Oct-07 Aug-07 Aug-07 Oct-07 Oct-07 Oct-07 Jul-07 Scheduled Check In house check: Oct-07 In house check: Oct-07 In house check: Oct-07 Signature	
	All calibrations have been or Calibration Equipment used Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Reference Probe ET3DV6 Reference Probe ET3DV6 Reference Probe ET3DV5 DAE4 Secondary Standards Power sensor HP 8481A RF generator Agi ent E4421 Network Analyzer HP 8753E	M&TE ortical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 (10r) SN: 1007 SN: 3025 SN 907 ID # MY41092317 MY41090875 US37390585 S4206 Name	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00806) 03-Oct-06 (METAS, No. 217-00806) 10-Aug-06 (METAS, No. 217-00591) 10-Aug-06 (METAS, No. 217-00591) 10-Oct-06 (SPEAG, No. E33-3025_Oct06) 19-Oct-06 (SPEAG, No. E33-3025_Oct06) 20-Jul-06 (SPEAG, No. DAE4-907_str06) Check Date (in house) 18-Oct-02 (SPEAG, in house check Oct-06) 11-May-05 (SPEAG, in house check Oct-06) 18-Oct-01 (SPEAG, in house check Oct-06) 18-Oct-01 (SPEAG, in house check Oct-06)	Scheduled Calibration Oct-07 Oct-07 Aug-07 Aug-07 Oct-07 Oct-07 Oct-07 Jul-07 Scheduled Check In house check: Oct-07 In house check: Oct-07 In house check: Oct-07 Signature	
	All calibrations have been or Calibration Equipment used Primary Standards Power meter EP-M-442A Power sensor HP 8481A Reference 20 dB Attenuator Reference Probe ET3DV0 Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RH generator Agient E4421 Network Analyzer HP 8753E Calibrated by:	M&TE ortical for calibration)  ID #  G837480704 US37292783 SN: 5086 (20g) SN: 5047.2 (10r) SN: 1507 SN: 1025 SN 907  ID #  MY41092317 MY41092317 MY41092317 MY41092317 NMY4109255 S4206 Name Mike Melli	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608) 10-Aug-06 (METAS, No. 217-00591) 10-Aug-06 (METAS, No. 217-00591) 10-Aug-06 (SPEAG, No. 217-00591) 10-Oct-06 (SPEAG, No. 253-3025_Oct08) 20-Jul-06 (SPEAG, No. 253-3025_Oct08) 20-Jul-06 (SPEAG, No. 253-3025_Oct08) 20-Jul-06 (SPEAG, No. 253-3025_Oct08) 20-Jul-06 (SPEAG, No. 253-3025_Oct08) 18-Oct-02 (SPEAG, No. 264-907_abl08) 18-Oct-02 (SPEAG, in house check Not-05) 18-Oct-01 (SPEAG, in house check Not-05) 18-Oct-01 (SPEAG, in house check Not-05) Function Laboratory Technician	Scheduled Calibration Oct-07 Oct-07 Aug-07 Aug-07 Oct-07 Oct-07 Oct-07 Jul-07 Scheduled Check In house check: Oct-07 In house check: Oct-07 In house check: Oct-07 Signature	

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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 3004 Zurich, Switzerland



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#### Glossary:

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

#### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- 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 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\_Jan07

#### Measurement Conditions

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

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan Resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

#### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.8 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) *C		-

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.49 mW / g
SAR normalized	normalized to 1W	38.0 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	37.0 mW/g±17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.98 mW / g
SAR normalized	normalized to 1W	19.9 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	19.6 mW / g ± 16.5 % (k=2)

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<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

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#### Appendix

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.0 Ω + 0.2 jΩ		
Return Loss	- 34.1 dB		

#### General Antenna Parameters and Design

	Electrical Delay (one direction)	1.197 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

#### Additional EUT Data

Manufactured by	SPEAG		
Manufactured on	November 15, 2001		

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#### DASY4 Validation Report for Head TSL

Date/Time: 09.01.2007 12:59:52

Test Laboratory: SPEAG, Zurich, Switzerland

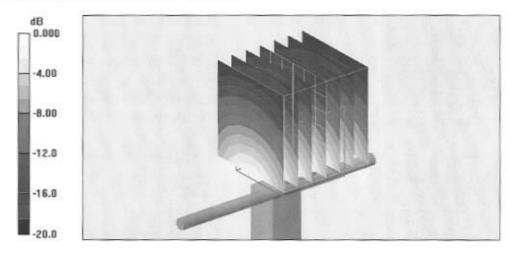
#### DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:545

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium: HSL U10 BB; Medium parameters used: f = 1900 MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 38.8$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

#### DASY4 Configuration:

- Probe: ET3DV6 SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- · Electronics: DAE4 Sp907; Calibrated: 20.07.2006
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 90.8 V/m; Power Drift = 0.018 dB Peak SAR (extrapolated) = 16.5 W/kg SAR(1 g) = 9.49 mW/g; SAR(10 g) = 4.98 mW/g Maximum value of SAR (measured) = 10.7 mW/g

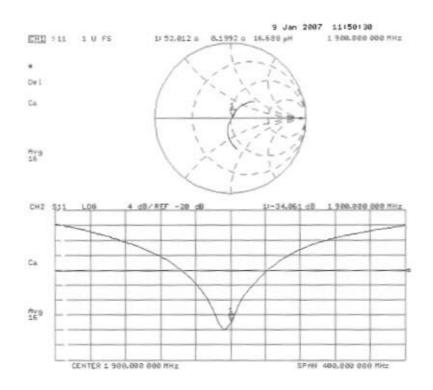


0 dB = 10.7mW/g

Certificate No: D1900V2-545\_Jan07

RTS RIM Testing Services	Document Appendix for the BlackBerr SAR Report	y® Smartphone Model	RBS21CW	Page 22(22)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	Aug. 13–22, 2007	RTS-0736-0708-09	L6ARBS20	CW

# Impedance Measurement Plot for Head TSL



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