RESEARCH IN MOTION	Appendices for foam hols Handheld Model No. RAC	2		Page 1(1)
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30G	N

APPENDIX A: SAR DISTRIBUTION COMPARISON FOR THE ACCURACY VERIFICATION

or Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30GN
			Page 1 of 1
		Date/Tin	ne: 11/03/03 12:25:57
Test Labor	ratory: Research In Motion Limited		
Ambient Ter	mperature: 24.2 (°C), Liquid Temperature: 22.5	5 (°C)	
DUT: Dip	ole 835 MHz; Type: D835V2; Serial:	D835V2 - SN:446	
	cation System: CW; Frequency: 835 M		
	335 MHz Head ( $\sigma = 0.895$ mbo/m, $\epsilon_r =$ ection: Flat Section	42.4288, p = 1000 kg/m <sup>3</sup> )	
<ul> <li>Phantom:</li> <li>Measurer</li> <li>Unnamed</li> <li>dz=5mm</li> <li>Reference</li> <li>Power Dri:</li> <li>Maximum</li> <li>Unnamed</li> <li>Peak SAR</li> <li>SAR(1 g)</li> <li>Reference</li> <li>Power Dri:</li> <li>Reference</li> <li>Power Dri:</li> </ul>	ies: DAE3 Sn472; Calibrated: 19/08/20 : SAM 1; Type: SAM 4.0; Serial: 1076 ment SW: DASY4, V4.1 Build 47; Pos procedure/Zoom Scan (61x61x71)/C Value = 113.1 V/m ft = 0.01 dB value of SAR = 11.8 mW/g procedure/Zoom Scan (7x7x7)/Cube (extrapolated) = 11.7 W/kg = 8.72 mW/g; SAR(10 g) = 5.8 mW/g Value = 113.1 V/m ft = 0.01 dB value of SAR = 9.41 mW/g	tprocessing SW: SEMCAD, V1.6 <b>ube 0:</b> Measurement grid: dx=5m	ım, dy—5mm,
dB 0 -2.02 -4.05 -6.07		1	

file://C:\Program%20Files\DASY4\Print\_Templates\Dipole%20validation%20for%2083... 05/11/2003

<sup>hor Data</sup> Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30GN
			Page 1 of 2
		Date/Tir	ne: 10/31/03 13:38:55
Test Labor	atory: Research In Motion Limited		
Ambient Ter	nperature: 24.4 (°C); Liquid Temperature: 22.1	(°C)	
DUT: Dip	ole 1900 MHz; Type: D1900V2; Seria	al: D1900V2 - SN:545	
Medium; I	eation System: CW; Frequency: 1900 N ISL 1900 ( $\sigma = 1.466$ mho/m, $\varepsilon_r = 40.49$ ection: Flat Section		
<ul> <li>Probe: E</li> <li>Sensor-S</li> <li>Electroni</li> <li>Phantom</li> </ul>	onfiguration: T3DV6 - SN1642; ConvF(5.4, 5.4, 5.4) urface: 4mm (Mechanical And Optical es: DAE3 Sn472; Calibrated: 19/08/20 : SAM 1; Type: SAM 4.0; Serial: 1076 ment SW: DASY4, V4.1 Build 47; Post	Surface Detection) 03	Build 116
dz=5mm Reference Power Drit	procedure/Zoom Scan (61x61x71)/C Value = 189.7 V/m ft = -0.02 dB value of SAR = 76.5 mW/g	ube 0: Measurement grid: dx=5n	un, dy=5mm,
Peak SAR SAR(1g) Reference Power Dri	procedure/Zoom Scan (7x7x7)/Cube (extrapolated) = 76.2 W/kg = 43.1 mW/g; SAR(10 g) = 22.3 mW/g Value = 189.7 V/m fit = -0.02 dB value of SAR = 48 mW/g	NA ADDITE LINE SOL & D	dy=5mm, dz=5mm
	B 3.49 5.98 10.5 14		
34 <u></u> 80	Family C		-

RESEARCH IN MOTION	Appendices for foam ho Handheld Model No. RA			Page 4(4)
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO3	)GN

APPENDIX B: SAR DISTRIBUTION PLOTS FOR BODY-WORN CONFIGURATION

RESEARCH IN MOTION	Appendices for foam holst Handheld Model No. RAC	5		Page 5(5)
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	)GN

Date/Time: 11/03/03 16:41:43

Test Laboratory: Research In Motion Limited

Ambient Temperature: 24.7 (°C); Liquid Temperature: 22.6 (°C)

### DUT: BlackBerry Wireless Handheld Model RAO30GN; Type: Sample; Configuration: Bodyworn with Horizontal Holster HDW-06619-000, front side facing the belt-clip

Communication System: GSM 850; Frequency: 836.8 MHz;Duty Cycle: 1:8.3 Medium: M 835 ( $\sigma$  = 0.97 mho/m,  $\epsilon_r$  = 53.8,  $\rho$  = 1000 kg/m<sup>3</sup>)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(6.4, 6.4, 6.4); Calibrated: 28/08/2003

- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)

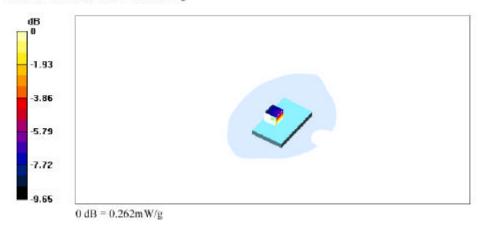
- Electronics: DAE3 Sn472; Calibrated: 19/08/2003
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Unnamed procedure/Zoom Scan (61x61x71)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.5 V/m Power Drift = -0.04 dB Maximum value of SAR = 0.367 mW/g

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Peak SAR (extrapolated) = 0.365 W/kg

SAR(1 g) = 0.248 mW/g; SAR(10 g) = 0.176 mW/g Reference Value - 15.5 V/m Power Drift = -0.04 dB Maximum value of SAR - 0.262 mW/g



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RESEARCH IN MOTION	Appendices for foam holst Handheld Model No. RAC			Page 6(6)
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	GN

Date/Time: 11/03/03 14:58:36

Test Laboratory: Research In Motion Limited

Ambient Temperature: 24.3 (°C); Liquid Temperature: 22.2 (°C)

### DUT: BlackBerry Wireless Handheld Model RAO30GN; Type: Sample; Configuration: Bodyworn with Vertical Holster HDW-06620-000, front side facing the belt-clip

Communication System: GSM 850; Frequency: 836.8 MHz;Duty Cycle: 1:8.3 Medium: M 835 ( $\sigma = 0.97$  mho/m,  $\epsilon_r = 53.8$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Flat Section

DASY4 Configuration:

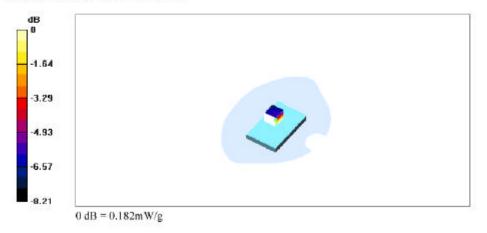
- Probe: ET3DV6 SN1642; ConvF(6.4, 6.4, 6.4); Calibrated: 28/08/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn472; Calibrated: 19/08/2003
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Unnamed procedure/Zoom Scan (61x61x71)/Cube 0: Measurement grid: dx=5mm, dy=5mm,

dz=5mm Reference Value = 14.4 V/m Power Drift = -0.2 dB Maximum value of SAR = 0.21 mW/g

#### Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Peak SAR (extrapolated) = 0.21 W/kg

SAR(1 g) = 0.173 mW/g; SAR(10 g) = 0.133 mW/g Reference Value = 14.4 V/m Power Drift = -0.2 dB Maximum value of SAR = 0.182 mW/g



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RESEARCH IN MOTION	Appendices for foam holste Handheld Model No. RAO			Page 7(7)
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	GN

Date/Time: 11/02/03 13:13:17

Test Laboratory: Research In Motion Limited

Ambient Temperature: 24.5 (°C); Liquid Temperature: 22.4 (°C)

### DUT: BlackBerry Wireless Handheld Model RAO30GN; Type: Sample; Configuration: Bodyworn with Horizontal Holster HDW-06619-000, front side facing the belt-clip

Communication System: PCS 1900; Frequency: **18**80 MHz;Duty Cycle: 1:8.3 Medium: M1900 ( $\sigma$  = 1.535 mho/m,  $\varepsilon_{r}$  = 51.075,  $\rho$  = 1000 kg/m<sup>3</sup>) Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(4.9, 4.9, 4.9); Calibrated: 28/08/2003

- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)

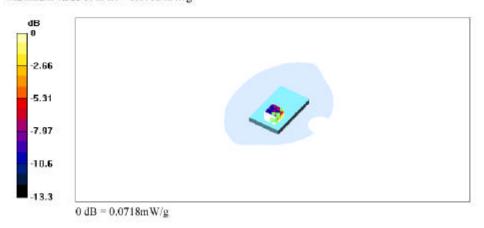
- Electronics: DAE3 Sn472; Calibrated: 19/08/2003
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Unnamed procedure/Zoom Scan (61x61x71)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.51 V/m Power Drift = -0.03 dB Maximum value of SAR = 0.0962 mW/g

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Peak SAR (extrapolated) = 0.096 W/kg

SAR(1 g) = 0.0671 mW/g; SAR(10 g) = 0.0443 mW/gReference Value = 5.51 V/mPower Drift = -0.03 dBMaximum value of SAR = 0.0718 mW/g



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RESEARCH IN MOTION	Appendices for foam holst Handheld Model No. RAC	•		Page 8(8)
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	GN

Date/Time: 10/31/03 15:12:57

Test Laboratory: Research In Motion Limited

Ambient Temperature: 24.5 (°C); Liquid Temperature: 22.1 (°C)

### DUT: BlackBerry Wireless Handheld Model RAO30GN; Type: Sample; Configuration: Bodyworn with Vertical Holster HDW-06620-000, front side facing the belt-clip

Communication System: PCS 1900; Frequency: **18**80 MHz;Duty Cycle: 1:8.3 Medium: M1900 ( $\sigma$  = 1.535 mho/m,  $\varepsilon_{r}$  = 51.075,  $\rho$  = 1000 kg/m<sup>3</sup>) Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1642; ConvF(4.9, 4.9, 4.9); Calibrated: 28/08/2003

- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)

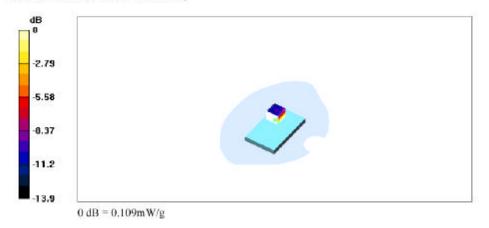
- Electronics: DAE3 Sn472; Calibrated: 19/08/2003
- Phantom: SAM 2; Type: SAM 4.0; Serial: 1080
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Unnamed procedure/Zoom Scan (61x61x71)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.31 V/m Power Drift = 0.09 dB Maximum value of SAR = 0.157 mW/g

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Peak SAR (extrapolated) = 0.157 W/kg

SAR(1 g) = 0.103 mW/g: SAR(10 g) = 0.0668 mW/gReference Value - 7.31 V/mPower Drift = 0.09 dBMaximum value of SAR - 0.109 mW/g



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RESEARCH IN MOTION	Appendices for foam holste Handheld Model No. RAO			Page 9(9)
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APPENDIX C: PROBE & DIPOLE CALIBRATION DATA

RESEARCH IN MOTION	Appendices for foam holst Handheld Model No. RAC			Page 10(10)
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	)GN

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

### Client RIM Real Real Real Real Real

CALIBRATION C	ENGLIGA		
Dbject(s)	ET3DV6 - SN:	1642	e del ne esta a la del
Calibration procedure(s)	QA CAL-01 v2 Calibration pro	cedure for dosimetric E-field prob	
Calibration date:	August 28, 20		aventerationalis) Marina activities
	n nya 🛶 nya 🖬 nakitu a	according to the specific calibratio	* - Classic de la 22 a habitet (n. 1919)
17025 international standard.	d in the closed laborator	used in the calibration procedures and conformity o ry facility: environment temperature 22 +/- 2 degree	
	ID#	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Model Type RF generator HP 8684C Power sensor E4412A Power sensor HP 8481A	U\$3642U01700 MY41495277 MY41092180	4-Aug-99 (SPEAG, in house check Aug-02) 2-Apr-03 (METAS, No 252-0250) 18-Sep-02 (Agilent, No, 20020918)	In house check: Aug-05 Apr-04 Sep-03
Power meter EPM E4419B Network Analyzer HP 8753E Fluke Process Calibrator Type 702	GB41293874 US37390585 SN: 6295803	2-Apr-03 (METAS, No 252-0250) 18-Oct-01 (Agilent, No. 24BR1033101) 3-Sep-01 (ELCAL, No.2360)	Apr-04 In house check: Oct 03 Sep-03
Calibrated by:	Name Nico Veteri	Function Team	
Approved by:	Kalje Pokovia	Laborstory Devotor	fler litz
		<b></b> .	Date issued: August 28, 2003
This calibration certificate is issued Calibration Laboratory of Schmid &		tion until the accreditation process (based on ISO/IE G is completed.	C 17025 International Standard) for

RESEARCH IN MOTION	Appendices for foam holst Handheld Model No. RAC	5		Page 11(11)
Author Data	Dates of Test	Test Report No	FCC ID:	GN
Daoud Attayi	Oct. 31 – Nov. 04, 2003	<b>RIM-0073-0311-01</b>	L6ARAO30	

Schmid & Partner Engineering AG

spea<u>g</u>

Zeughausstrasse 43, 8004 Zurich, Switzerland Phone +41 1 245 9700, Fax +41 1 245 9779 info@speag.com, http://www.speag.com

# Probe ET3DV6

# SN:1642

Manufactured:November 7, 2001Last calibration:July 26, 2002Recalibrated:August 28, 2003

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

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Author Data	Dates of Test	Test Report No RIM-0073-0311-01	FCC ID: L6ARAO30		
Daoud Attayi	Oct. 31 – Nov. 04, 2003	KIIVI-00/3-0311-01	LOAKAUSU	GN	

### August 28, 2003

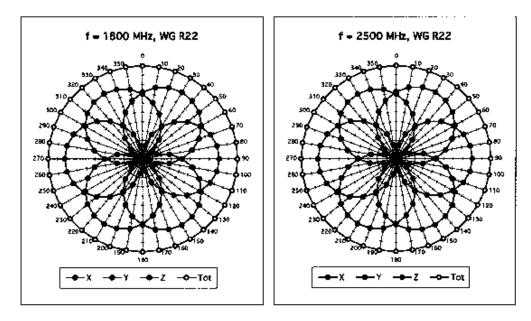
### DASY - Parameters of Probe: ET3DV6 SN:1642

Sensitiv	ity in Free	e Space		Diode Co	ompressio	on	
	NormX	1.64	t μV/(V/m)²		DCP X	96	πV
	NormY	1.86	ş μV/(V/m)²		DCP Y	96	mV
	NormZ	1.61	μV/(V/m) <sup>2</sup>		DCP Z	96	mV
Sensitivi	ity in Tissue	e Simulatin	g Liquid				
Head	90	Q MHz	s,= 41.5 ± 5	% σ'	0.97 ± 5%	mho/m	
Valid for fee	800-1000 MHz 1		a Simulating Liquid accord	ding to EN 5036	1, P1528-200	x	
	ConvF X		à ± 9.5% (k=2)		Boundary e	ffect:	
	ConvF Y	6.6	i±9.5% (k=2)		Alpha	0.27	
	ConvF Z	6.6	〕 ± 9.5% (k=2)		Depth	3.41	
Head	180	0 MHz	e,= 40.0 ± 5	96 av	■ 1.40 ± 5%	i mho/m	
Valid for f="	1710-1910 MHz	with Head Tas	ue Simulating Liquid ecco	rding to EN 503	61, P1 528-20	OX .	
	ConvF X		± 9.5% (k=2)		Boundary e	ffect:	
	ConvF Y	5.4	± 9.5% (k=2)		Alpha	0.48	
	ConvF Z	5.4	± 9.5% (k=2)		Depth	2,57	
Bounda	ry Effect						
Head	90	10 MHz	Typical SAR gradient	: 5 % per mm			
	Probe Tip to	Boundary			1 mm	2 (1917)	
	SAR <sub>be</sub> [%]	Without Corr	ection Algorithm		10.6	6.6	
	SAR <sub>ee</sub> [%]	With Correct	ion Algorithm		0.6	0.6	
Head	160	10 MHz	Typical SAR gradient	: 10 % per mm			
	Probe Tip to	Boundary			1 നന	2 mm	
	SAR [%]	Without Con	rection Algorithm		12.7	8.5	
	SAR <sub>60</sub> [%]	With Correct	ion Algorithm		0.2	0.1	
Sensor	Offset						
	Probe Tip to	Sensor Center		27		mm	
	Optical Surfa	ce Detection		1.0 ± 0.2		mm	

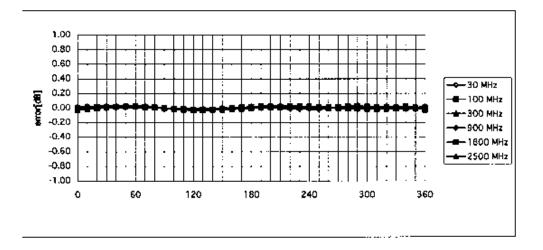
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RESEARCH IN MOTION	Appendices for foam holsters and BlackBerry Wireless Handheld Model No. RAO30GN SAR Compliance Test			Page 13(13)
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August 28, 2003



Isotropy Error ( $\phi$ ),  $\theta = 0^{\circ}$ 



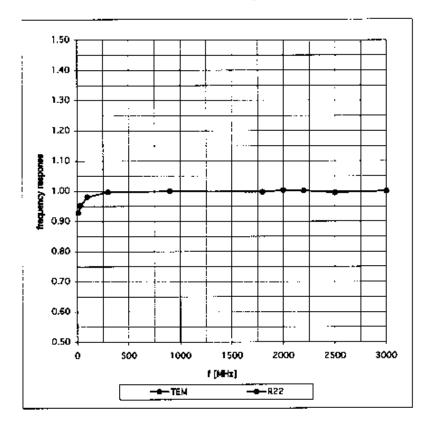


RESEARCH IN MOTION	Appendices for foam holste Handheld Model No. RAO			Page 14(14)
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	GN

August 28, 2003

### **Frequency Response of E-Field**

(TEM-Cell:清110, Waveguide R22)



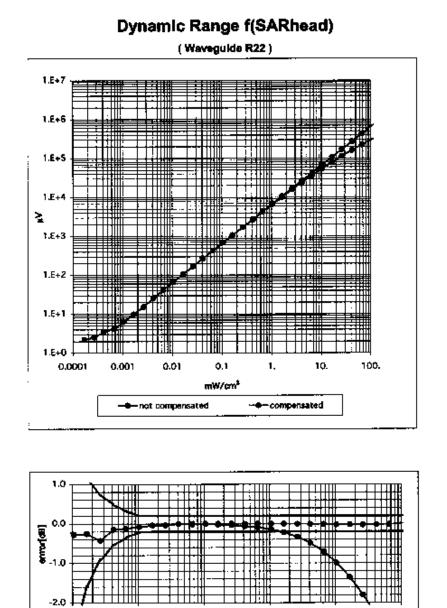
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RESEARCH IN MOTION	Appendices for foam holsters and BlackBerry Wireless Handheld Model No. RAO30GN SAR Compliance Test			Page 15(15)
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No RIM-0073-0311-01	FCC ID: L6ARAO30	GN

August 28, 2003

100

10



mW/cm<sup>3</sup>

0.1

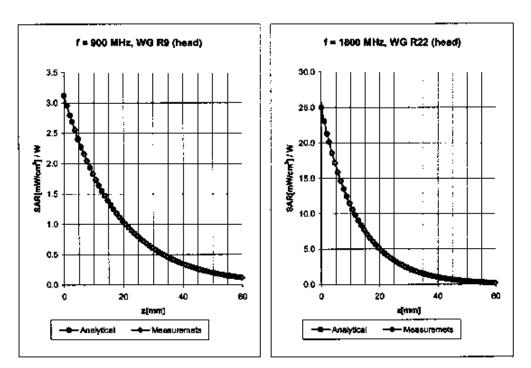
1

0.001

0.01

RESEARCH IN MOTION		Appendices for foam holsters and BlackBerry Wireless Handheld Model No. RAO30GN SAR Compliance Test		
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	GN

August 28, 2003



## **Conversion Factor Assessment**

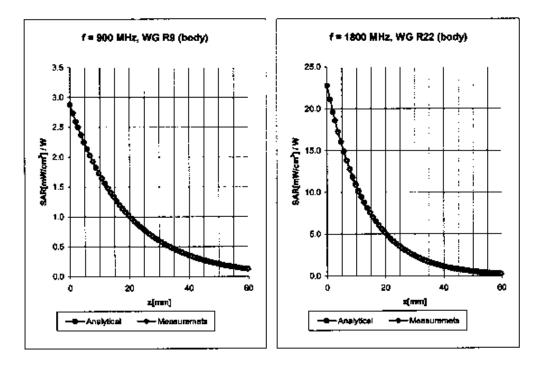
Head	900 N	Hz s,= 41.5 ± 5%	
Valid for fi	-800-1000 MHz with	Head Tissue Simulating Liquid according t	to EN 50361, P1528-200X
	ConvF X	6.6 ± 9.5% (k=2)	Boundary effect:
	ConvF Y	6.6 ± 9.5% (k=2)	Alpha 0.27
	ConvF Z	6.6 ± 9.5% (k=2)	Depth 3.41
Head	1800 N	(Hz ¢,= 40.0 ± 5%	a = 1.40 ± 5% mho/m
Valid for f	-1710-1910 MHz wi	th Head Tissue Simulating Liquid according	to EN 50361, P1526-200X
	ConvF X	5.4 ± 9.5% (k=2)	Boundary effect:
	ConvF Y	5.4 ± 9.5% (k=2)	Aipha 0.48
	ConvF Z	5.4 ±9.5% (k=2)	Depth 2.57

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RESEARCH IN MOTION		Appendices for foam holsters and BlackBerry Wireless Handheld Model No. RAO30GN SAR Compliance Test		
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	GN

August 28, 2003

## **Conversion Factor Assessment**



Body	900 (	AHz.	4 = 55.0 ± 5%	a=	1.05 ± 5%	mho/m
Valid for t	=800-1000 MHz with	h Body Tissue Si	mulating Liquid according t	to OET 65	Suppl. C	
	ConvF X	6.4 ±	9.6% (k=2)		Boundary eff	ect:
	ConvF Y	6.4 ±	9.6% (k=2)		Alpha	0.38
	ConvF Z	6.4 ±	9.5% (k=2)		Depth	2.58
Body	1800	Hz	e,= 53.3 ± 5%	<b>a</b> =	1.52 ± 5%	mho/m
Vald for I	⊷1710-1910 MHz w	th Sody Tierus :	Simulating Liquid according	to CET 65	5 Suppl. C	
	ConvF X	4.9 ±	9.5% (k=2)		Soundary eff	ect:
	ConvF Y	4.9 ±	9.6% (k=2)		Alpha	0.58
	ConvF Z	4.9 ±	9.5% (k=2)		Depth	2.60

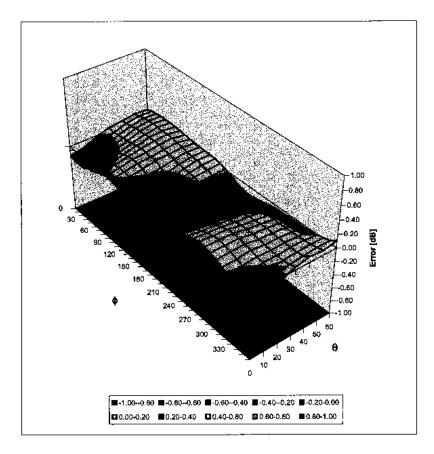
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RESEARCH IN MOTION		Appendices for foam holsters and BlackBerry Wireless Handheld Model No. RAO30GN SAR Compliance Test		
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No RIM-0073-0311-01	FCC ID: L6ARAO30	GN

August 28, 2003

### **Deviation from Isotropy in HSL**

Error (θ,φ), f = 900 MHz



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RESEARCH IN MOTION		Appendices for foam holsters and BlackBerry Wireless Handheld Model No. RAO30GN SAR Compliance Test		
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	GN

August 28, 2003

### f = 30 MHz, TEM cell ifi110 f = 100 MHz, TEM cell ifi110 28 ŻAI 270 270 Zŧ 25 10 25 -Z -**0--** Tot ·۲ **--**•−Z -Y ------0 - Tot f = 300 MHz, TEM cell ifi110 f = 900 MHz, TEM cell ifi110 314 300 280 280 274 260 260 254 25

## Receiving Pattern ( $\phi$ ), $\theta$ = 0°



180

 180

--**0--** Tot

-¥ — → Z

X

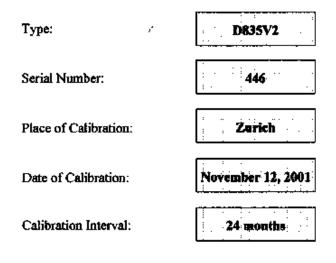
RESEARCH IN MOTION		Appendices for foam holsters and BlackBerry Wireless Handheld Model No. RAO30GN SAR Compliance Test		
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No RIM-0073-0311-01	FCC ID: L6ARAO30	GN

## Schmid & Partner Engineering AG

Zoughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

### **Calibration Certificate**

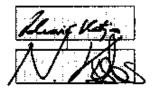
### 835 MHz System Validation Dipole



Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever spplicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:



Approved by:

RESEARCH IN MOTION	Appendices for foam holst Handheld Model No. RAC	5		Page 21(21)
Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	GN



Zeughausstrasse 43, 6004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

# DASY

# **Dipole Validation Kit**

# Type: D835V2

## Serial: 446

# Manufactured: Calibrated:

October 24, 2001 November 12, 2001

RESEARCH IN MOTION		Appendices for foam holsters and BlackBerry Wireless Handheld Model No. RAO30GN SAR Compliance Test				
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### . Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom filled with head simulating solution of the following electrical parameters at 835 MHz:

Relative Dielectricity	42.3	± 5%
Conductivity	0,91 mho/m	± 5%

The DASY3 System (Software version 3.1c) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.27 at 900 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was <u>15mm</u> from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 20mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging.

The dipole input power (forward power) was 250mW  $\pm 3$  %. The results are normalized to 1W input power.

#### \_

### 2. SAR Measurement

Standard SAR-measurements were performed with the phantom according to the measurement conditions described in section 1. The results have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over $1 \text{ cm}^3$ (1 g) of tissue:	10.7 mW/g
averaged over 10 cm3 (10 g) of tissue:	6.84 mW/g

Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well.

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### 3. Dipole impedance and Return Loss

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The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	1.401 ms	(one direction)
Transmission factor:	0.993	(voltage transmission, one direction) -

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 835 MHz:		Re(Z) = 49.8 Ω
,	1	lm {Z} = -4.8 Ω
Return Loss at 835 MHz		-26.4 dB

### 4. Hendling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

### 5. Design

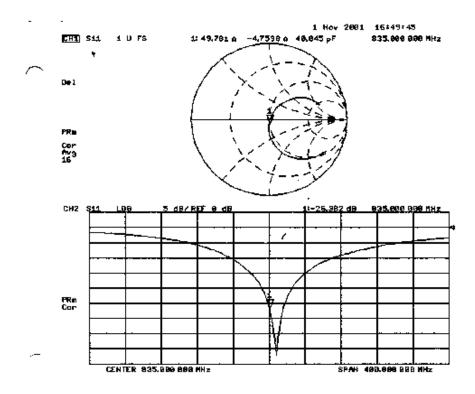
The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

### 6. Power Test

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

ESEARCH IN MOTION	Handhel	ices for fo d Model		AO30	GN	SAR				e T	est		<sup>Page</sup> 24(24)
uthor Data <b>Daoud Attayi</b>	Dates of Test Oct. 31 – 1	Nov. 04, 20	003	Tes R	t Report	No 073-(	)311	-01		FCC	D: <b>5ARA</b>	<b>O30</b> G	N
•		SAR <sub>Ta</sub> [mW/g]	2.50E+0	2.00E+0	1.75E+0	1.50E+0	1.25E+0	1.00E+0	7.50E-1	5.00E-1	2.50E-1		
Validation Dipole D835V2 SN:446, d = 15 mm Frequency: 835 MHz, Antenna Input Power. 250 [mW] SAM Phantom: Flat Section: Grid Spacing: Dx = 20.0, Dy = 20.0, Dz = 10.0 Probe: ET3DV6 - SN1507, ConvF(6.27,6.27,6.27,0.420,0.Hz, IEEE 1528.85 MHz, o = 0.91 mholm e <sub>i</sub> = 42.3 p = 1.00 g/cm <sup>3</sup>	oubes (2). Flam: 4.30, mWg ± 0.00 db, SAK (1g): 2.58, mWg ± 0.01 db, SAK (10g): 1.71, mWg ± 0.02 db, (Worst-case extrapolation) Penetration depth: 12.0 (10.6, 13.7) [mm] Powerdrift0.00 dB												Schmid & Partner Engineering AG, Zurich, Switzerland

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Author Data Daoud Attayi	Dates of Test Oct. 31 – Nov. 04, 2003	Test Report No <b>RIM-0073-0311-01</b>	FCC ID: L6ARAO30	GN		

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

### Client RIM PERSENCE STREET

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QA CAL-05 v2 Calibration pro	z cadure for dipole validation kits	
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In Tolerance (	according to the specific calibratic	on document)
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1D # 100698 MY41092317 US37292783 GB37480704 US37390585	Cai Date (Calibrated by, Certificate No.) 27-Mar-2002 (R&S, No. 20-92389) 18-Oct-02 (Aglient, No. 20021018) 30-Oct-02 (METAS, No. 252-0236) 30-Oct-02 (METAS, No. 252-0236) 18-Oct-01 (Aglient, No. 24BR1033101)	Scheduled Calibration In house check: Mar-05 Oct-04 Oct-03 Oct-03 In house check: Oct 03
Name A <b>rdth: Mue≇er</b>	Function Technician	Signature
Kalje Pokovic	Laboratory Director	Alme 11 to
		Date issued: August 24, 2003
ed as an intermediate sole & Partner Engineering A		IEC 17025 International Standard) for
	Calibration pro August 22, 20 In Tolerance ( ants traceability of M&TE ted in the closed laborate te critical for calibration) <u>ID #</u> 100698 MY41092317 US3729278 GB37480704 US37390585 Name Judith Musser	Calibration procedure for dipole validation kits August 22, 2003 In Tolerance (according to the specific calibratio ents traceability of M&TE used in the calibration procedures and conformity ted in the closed (aboratory facility: environment temperature 22 -/- 2 degre TE critical for calibration) ID # Cal Date (Calibrated by, Certificate No.) 100698 27-Mar-2002 (R8.S, No. 20-92389) MY41092317 18-Oct-02 (Agilent, No. 20021018) US37292783 30-Oct-02 (METAS, No. 252-0236) US37390585 18-Oct-01 (Agilent, No. 24BR1033101) Name Function Udith Muster Katja Foloato Katja Foloato

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Schmid & Panner Engineering AG

<u>s p e a g</u>

Zeughausstrasse 43, 6004 Zurich. Switzerland Phone +41 1 245 9700, Fax +41 1 245 9779 info@speeg.com, http://www.speeg.com

# DASY

# **Dipole Validation Kit**

# Type: D1900V2

# Serial: 545

Manufactured: November 15, 2001 Calibrated: August 22, 2003

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### 1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with head simulating solution of the following electrical parameters at 1900 MHz:

Relative Dielectricity	40.2	± 5%
Conductivity	1.46 mho/m	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.2 at 1900 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was <u>10mm</u> from dipole center to the solution surface. The included distance spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was 250 mW  $\pm$  3 %. The results are normalized to 1W input power.

### 2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the <u>advanced extrapolation</u> are:

 averaged over 1 cm<sup>3</sup> (1 g) of tissue:
 41.2 mW/g ± 16.8 % (k=2)<sup>1</sup>

 averaged over 10 cm<sup>3</sup> (10 g) of tissue:
 21.3 mW/g ± 16.2 % (k=2)<sup>1</sup>

validation uncertainty

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### 3. Dipole Immediance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	1.198 ns	(one direction)
Transmission factor:	0.984	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance spacer was in place during impedance measurements.

Feedpoint impedance at 1900 MHz:	Re{Z} = 49.7 Ω
	lm (Z) = 0,96 Ω
Return Loss at 1900 MHz	-39.9 dB

#### 4. Handling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

#### 5. Design

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.

Small end caps have been added to the dipole arms in order to improve matching when loaded according to the position as explained in Section 1. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

#### 6. Power Test

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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Test Laboratory: SPEAG, Zurich, Switzerland File Name: <u>SN545\_SN1507\_HSL1900\_220803.da4</u>

### DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN545 Program: Dipole Calibration

Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1 Medium: HSL 1900 MHz ( $\sigma = 1.46$  mbo/m,  $\epsilon_{\tau} = 40.17$ ,  $\rho = 1000$  kg/m<sup>3</sup>) Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

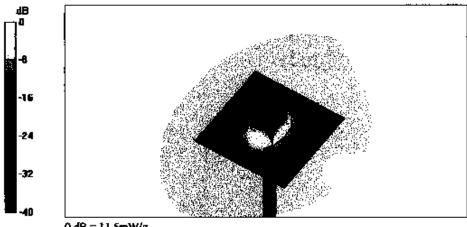
**DASY4** Configuration:

- Probe: ET3DV6 \$N1507; ConvF(5.2, 5.2, 5.2); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 10 mm/Ares Scan (\$1x\$1x1): Measurement grid: dx=15mm, dy=15mm Reference Value = 93.6 V/m Power Drift = 0.05 dB Maximum value of SAR = 11.5 mW/g

**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cabe 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm Peak SAR (extrapolated) = 17.7 W/kg SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.32 mW/g

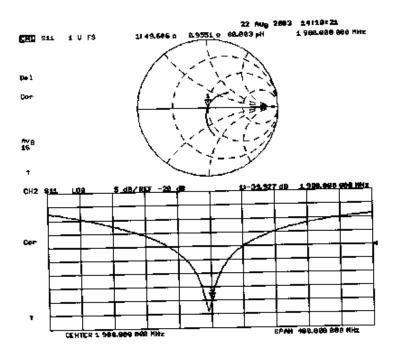
Reference Value = 93.6 V/m Power Drift = 0.05 dB Maximum value of SAR = 11.5 mW/g



0 dB = 11.5mW/g

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545



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APPENDIX D: SAR SET UP PHOTOS

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Figure D1. Body worn configuration with Vertical and Horizontal foam holsters