



Research In Motion Limited
295 Phillip Street
Waterloo, Ontario
Canada N2L 3W8
Tel: +1 519 888 7465, Fax: +1 519 888 6906
E-mail: info@rim.net

February 7, 2003

Stan Lyles
Federal Communications Commission,
Equipment Authorization Division
Application Processing Branch
7435 Oakland Mills Road
Columbia, MD 21045

Subject: Response to the FCC Correspondence Reference Number 24789 dated February 06, 2003 for additional information on RIM BlackBerry Wireless Handheld FCC ID: L6AR6120CN, 731 Confirmation Number **EA651160**

ITEM 1:

The holder is made of plastic material, which should minimally affect antenna performance or SAR measurements.

A SAR measurement comparison was conducted with the antenna close to and far from the holder for the 835 MHz head configuration. The SAR result increased by 1.7 % when a Styrofoam spacer was used that provided an additional 40mm separation distance between antenna and holder.

Title

SubTitle

June 06, 2002 01:49 PM

Frequency	e'	e''
800.000000 MHz	41.5013	19.3631
805.000000 MHz	41.4542	19.3640
810.000000 MHz	41.3917	19.3638
815.000000 MHz	41.3516	19.3630
820.000000 MHz	41.3231	19.3432
825.000000 MHz	41.2804	19.3274
830.000000 MHz	41.2189	19.3170
835.000000 MHz	41.1655	19.2941
840.000000 MHz	41.1572	19.2799
845.000000 MHz	41.1011	19.2792
850.000000 MHz	41.0186	19.2549
855.000000 MHz	40.9483	19.1968
860.000000 MHz	40.8882	19.2083
865.000000 MHz	40.8104	19.1535
870.000000 MHz	40.7282	19.1515
875.000000 MHz	40.6419	19.1308
880.000000 MHz	40.5686	19.1168
885.000000 MHz	40.4845	19.0964
890.000000 MHz	40.4160	19.0918
895.000000 MHz	40.3583	19.0694
900.000000 MHz	40.3177	19.0523
905.000000 MHz	40.2512	19.0283
910.000000 MHz	40.1724	19.0426
915.000000 MHz	40.1099	19.0425

Dielectric property measurements for 835 head tissue



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06/06/02

Dipole 835

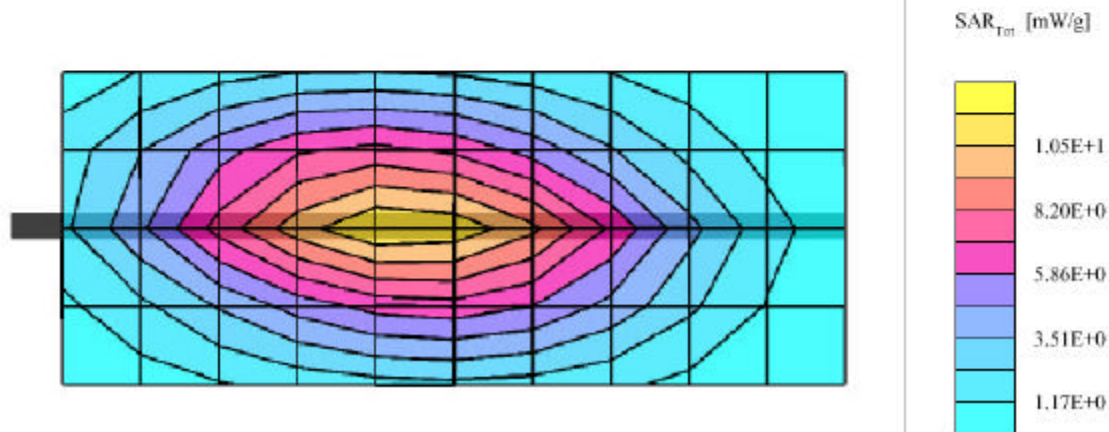
SAM 1; Flat

Probe: ET3DV6 - SN1643; ConvF(6.55,6.55,6.55); Crest factor: 1.0; Head 835 MHz: $\sigma = 0.90$ mho/m $\epsilon_r = 41.2$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 17.6 mW/g, SAR (1g): 10.8 mW/g, SAR (10g): 6.81 mW/g, (Worst-case extrapolation)

Penetration depth: 11.6 (10.2, 13.6) [mm]

Powerdrift: -0.04 dB



Dipole validation for 835 MHz head tissue



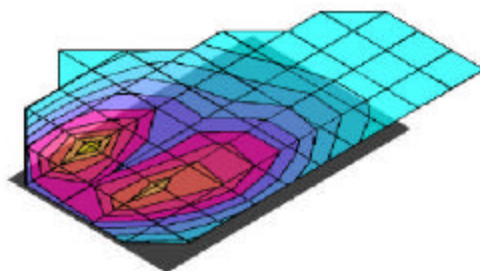
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06/06/02

BlackBerry Wireless Handheld

SAM 1; Left Hand
Probe: ET3DV6 - SN1643; ConvF(6.55,6.55,6.55); Crest factor: 1.0; Head 835 MHz; $\sigma = 0.90$ mho/m $\epsilon_r = 41.2$ $\rho = 1.00$ g/cm³
Cube 5x5x7; Peak: 1.64 mW/g, SAR (1g): 0.917 mW/g, SAR (10g): 0.535 mW/g. (Worst-case extrapolation)
Penetration depth: 13.1 (10.6, 16.3) [mm]
Powerdrift: -0.92 dB

Cellular CDMA
Channel 1013
Antenna closer to holder

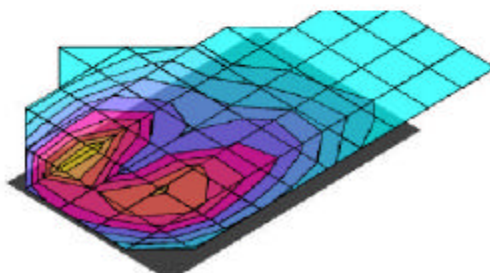


06/06/02

BlackBerry Wireless Handheld

SAM 1; Left Hand
Probe: ET3DV6 - SN1643; ConvF(6.55,6.55,6.55); Crest factor: 1.0; Head 835 MHz; $\sigma = 0.90$ mho/m $\epsilon_r = 41.2$ $\rho = 1.00$ g/cm³
Cube 5x5x7; Peak: 1.93 mW/g, SAR (1g): 0.933 mW/g, SAR (10g): 0.558 mW/g. (Worst-case extrapolation)
Penetration depth: 20.4 (13.7, 35.6) [mm]
Powerdrift: -0.09 dB

Cellular CDMA
Channel 1013
40 mm space between antenna and holder



Head SAR results comparison with antenna close to and far (40mm distance) from the holder



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SAR set-up photos for head configuration: antenna close to (top) and far (bottom - 40mm distance) from the holder



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ITEM 2:

Our phantoms are SAM Twin, manufactured by SPEAG and they comply with the September 15, 2002, FCC Public notice and the new Supplement C SAM Twin-phantom requirements. Our current SAR report template incorporates a SPEAG procedure that refers to a Generic Twin phantom. In future submissions, we will correct this.

ITEM 3:

The maximum 10 g hand SAR for the left edge in the PCS band is 3.17 W/kg, which is below the FCC limit of 4.0 W/kg and consequently a warning is not required. In addition, there is a distance of ~ 5 mm between the internal antenna and the left edge of the handheld.

ITEM 4:

The probe and dipole calibration report was provided in Appendix A-E and was uploaded separately from the report under the Exhibit RF Exposure Info. Please refer to the Appendix for probe and dipole calibration data.

ITEM 5:

CDMA835 left edge hand SAR 10 g data and plots:

5.1 System accuracy verification

f (MHz)	Limits / Measured	SAR (W/kg) 1 g/ 10 g	Dielectric Parameters		Liquid Temp (°C)
			ϵ_r	σ [S/m]	
CDMA Cellular 835	Measured	10.9 / 6.87	42.27	0.90	23.0
	Recommended Limits	10.70 / 6.84	42.3	0.91	N/A

5.2 Electrical parameters of the tissue simulating liquid

f (MHz)	Tissue Type	Limits / Measured	Dielectric Parameters		Liquid Temp (°C)
			ϵ_r	σ [S/m]	
CDMA Cellular 835	Head	Measured	42.27	0.90	23.0
		Recommended Limits	42.3	0.91	N/A
	Muscle	Measured	56.0	0.99	22.8
		Recommended Limits	56.1	0.95	N/A



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5.3 SAR Measurement results at highest power for left edge cellular band

Mode	f (MHz)	Conducted Output Power (dBm)	Liquid Temp (°C)	SAR, averaged over 10 g (W/kg)
CDMA Cellular 835	824.70	23.52	22.9	0.99
	836.52	23.14	23.1	0.69
	848.31	23.15	22.9	0.69

Title

SubTitle

February 06, 2003 03:28 PM

Frequency	e'	e''
800.000000 MHz	42.6722	19.5411
805.000000 MHz	42.6351	19.5189
810.000000 MHz	42.5593	19.5293
815.000000 MHz	42.5090	19.5113
820.000000 MHz	42.4533	19.4896
825.000000 MHz	42.4048	19.4716
830.000000 MHz	42.3208	19.4746
835.000000 MHz	42.2743	19.4565
840.000000 MHz	42.2036	19.4246
845.000000 MHz	42.1396	19.4123
850.000000 MHz	42.0821	19.4191
855.000000 MHz	42.0050	19.3904
860.000000 MHz	41.9351	19.3652
865.000000 MHz	41.8812	19.3563
870.000000 MHz	41.8127	19.3467
875.000000 MHz	41.7799	19.3169
880.000000 MHz	41.7160	19.3167
885.000000 MHz	41.6466	19.3284
890.000000 MHz	41.6146	19.2940
895.000000 MHz	41.5952	19.2662
900.000000 MHz	41.5443	19.2480
905.000000 MHz	41.4970	19.2389
910.000000 MHz	41.4315	19.2159
915.000000 MHz	41.3868	19.2261

Title

SubTitle

February 06, 2003 03:34 PM

Frequency	e'	e''
800.000000 MHz	56.3351	21.3390
805.000000 MHz	56.3081	21.3262
810.000000 MHz	56.2751	21.3098
815.000000 MHz	56.2096	21.2943
820.000000 MHz	56.1737	21.2793
825.000000 MHz	56.1196	21.2432
830.000000 MHz	56.0557	21.2224
835.000000 MHz	56.0369	21.2292
840.000000 MHz	55.9618	21.2020
845.000000 MHz	55.9152	21.1312
850.000000 MHz	55.8726	21.1254
855.000000 MHz	55.8309	21.1193
860.000000 MHz	55.7829	21.0940
865.000000 MHz	55.7566	21.0388
870.000000 MHz	55.6506	21.0261
875.000000 MHz	55.6334	20.9896
880.000000 MHz	55.5983	20.9603
885.000000 MHz	55.5457	20.9383
890.000000 MHz	55.5343	20.9372
895.000000 MHz	55.4953	20.9047
900.000000 MHz	55.4452	20.8560
905.000000 MHz	55.4322	20.8450
910.000000 MHz	55.3858	20.8268
915.000000 MHz	55.3629	20.7627



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02/06/03

Dipole 835

SAM 1; Flat

Probe: ET3DV6 - SN1644; ConvF(6.60,6.60,6.60); Crest factor: 1.0; Head 835 MHz: $\sigma = 0.90$ mho/m $\epsilon_r = 42.3$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 17.7 mW/g, SAR (1g): 10.9 mW/g, SAR (10g): 6.87 mW/g, (Worst-case extrapolation)

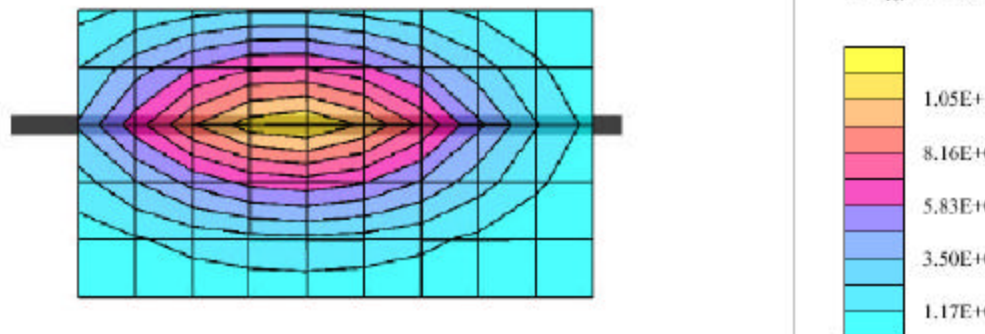
Penetration depth: 11.5 (10.1, 13.5) [mm]

Powerdrift: 0.02 dB

Tested on February 6 th, 2003

Ambient temperature: 24.5 deg. cel.

Liquid temperature: 22.9 deg. cel.





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02/06/03

BlackBerry Wireless Handheld Model No. R6120CN

SAM 2; Flat

Probe: ET3DV6 - SN1644; ConvF(6.40,6.40,6.40); Crest factor: 1.0; Muscle 835 MHz: $\sigma = 0.99$ mho/m $\epsilon_r = 56.0$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 2.90 mW/g, SAR (1g): 1.69 mW/g, SAR (10g): 0.993 mW/g, (Worst-case extrapolation)

Penetration depth: 11.5 (9.8, 13.9) [mm]

Powerdrift: -0.35 dB

Hand SAR, left side touching flat phantom

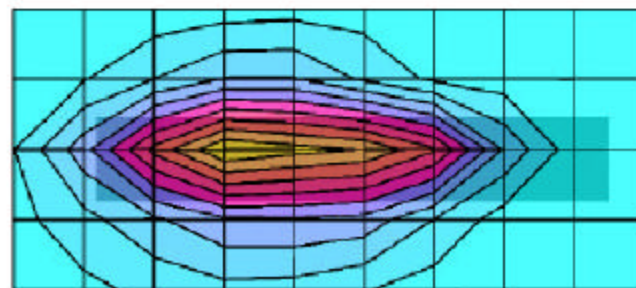
Cellular band

Channel: 1013

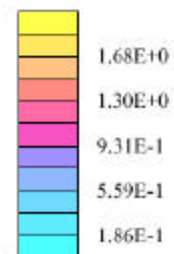
Tested on February 6 th, 2003

Ambient temperature: 24.6 deg. cel.

Liquid temperature: 22.9 deg. cel.



SAR_{10g} [mW/g]





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ITEM 6:
SAR plots for all test configurations:
12/06/02

BlackBerry Wireless Handheld Model No. R6120CN

SAM 1; Left Hand

Probe: ET3DV6 - SN1644; ConvF(6.60,6.60,6.60); Crest factor: 1.0; Head 835 MHz: $\sigma = 0.91$ mho/m $\epsilon_r = 42.2$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 1.96 mW/g, SAR (1g): 1.19 mW/g, SAR (10g): 0.721 mW/g, (Worst-case extrapolation)

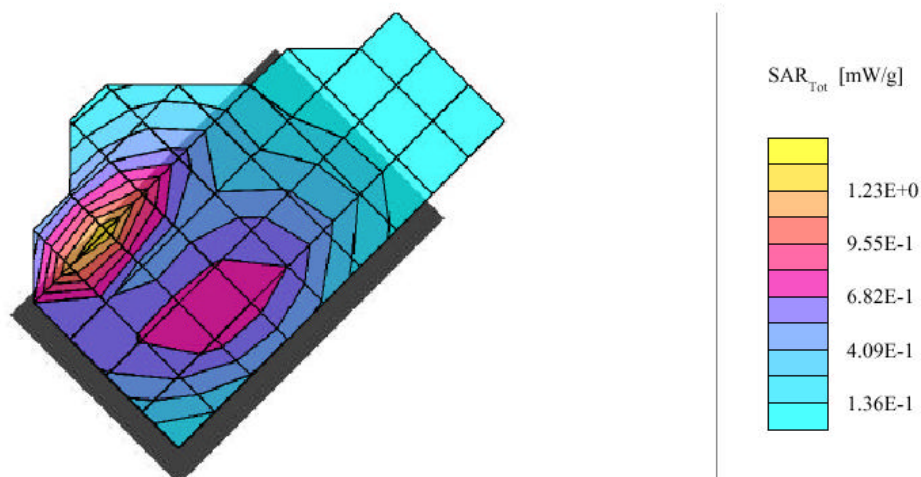
Penetration depth: 12.9 (11.5, 14.8) [mm]

Powerdrift: -0.01 dB

Date: December 06, 2002

Ambient temperature: 23.9 deg. cel.

Liquid temperature: 23.0 deg. cel.





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12/06/02

BlackBerry Wireless Handheld Model No. R6120CN

SAM 1; Left Hand

Probe: ET3DV6 - SN1644; ConvF(6.60,6.60,6.60); Crest factor: 1.0; Head 835 MHz: $\sigma = 0.91$ mho/m $\epsilon_r = 42.2$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 0.785 mW/g, SAR (1g): 0.542 mW/g, SAR (10g): 0.377 mW/g, (Worst-case extrapolation)

Penetration depth: 15.7 (13.7, 17.8) [mm]

Powerdrift: -0.18 dB

Tilted left

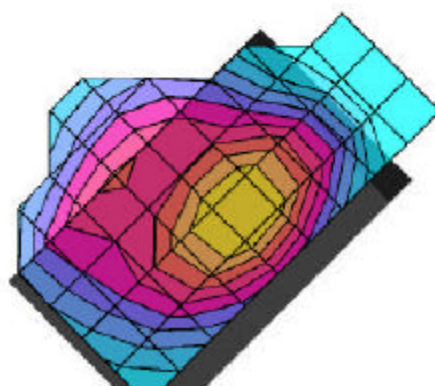
Cellular band

Channel: 777

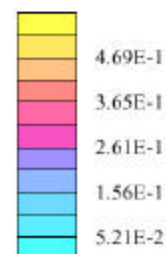
Tested on Dec. 06, 2002

Ambient temperature: 24.0 deg. cel.

Liquid temperature: 22.9 deg. cel.



SAR_{tot} [mW/g]





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Waterloo, Ontario
Canada N2L 3W8
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12/06/02

BlackBerry Wireless Handheld Model No. R6120CN

SAM 1; Right Hand

Probe: ET3DV6 - SN1644; ConvF(6.60,6.60,6.60); Crest factor: 1.0; Head 835 MHz: $\sigma = 0.91$ mho/m $\epsilon_r = 42.2$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 2.62 mW/g, SAR (1g): 1.46 mW/g, SAR (10g): 0.821 mW/g, (Worst-case extrapolation)

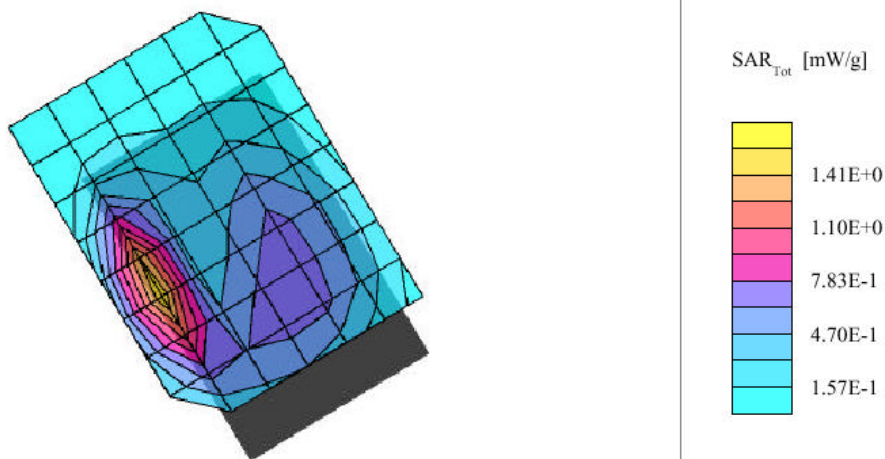
Penetration depth: 12.7 (11.1, 14.7) [mm]

Powerdrift: -0.01 dB

Date: December 06, 2002

Ambient temperature: 23.9 deg. cel.

Liquid temperature: 23.4 deg. cel.





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12/06/02

BlackBerry Wireless Handheld Model No. R6120CN

SAM 1; Right Hand

Probe: ET3DV6 - SN1644; ConvF(6.60,6.60,6.60); Crest factor: 1.0; Head 835 MHz: $\sigma = 0.91$ mho/m $\epsilon_r = 42.2$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 0.774 mW/g, SAR (1g): 0.528 mW/g, SAR (10g): 0.365 mW/g, (Worst-case extrapolation)

Penetration depth: 15.2 (13.5, 16.9) [mm]

Powerdrift: -0.36 dB

Tilted right

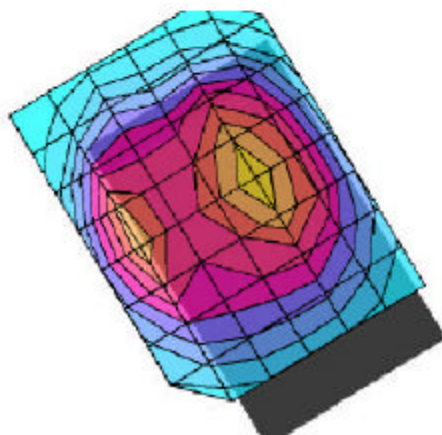
Cellular band

Channel: 777

Tested on Dec. 06, 2002

Ambient temperature: 24.5 deg. cel.

Liquid temperature: 23.4 deg. cel.



SAR_{tot} [mW/g]





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Canada N2L 3W8
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11/29/02

BlackBerry Wireless Handheld Model No. R6120CN

SAM 2; Left Hand

Probe: ET3DV6 - SN1644; ConvF(5.40,5.40,5.40); Crest factor: 1.0; Head 1900 MHz: $\sigma = 1.44$ mho/m $\epsilon_r = 38.2$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 1.34 mW/g, SAR (1g): 0.713 mW/g, SAR (10g): 0.364 mW/g, (Worst-case extrapolation)

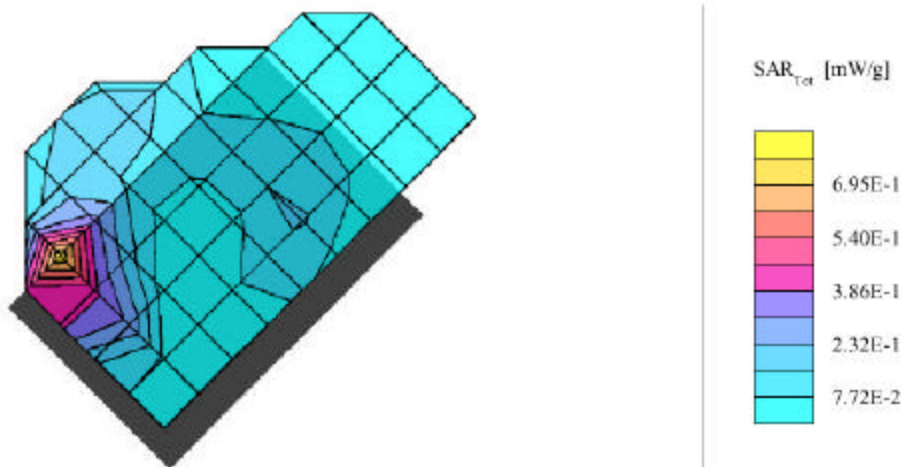
Penetration depth: 8.5 (8.1, 9.3) [mm]

Powerdrift: -0.30 dB

Date: November 28, 2002

Ambient temperature: 24.1 deg. cel.

Liquid temperature: 22.8 deg. cel.





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Tel: +1 519 888 7465, Fax: +1 519 888 6906
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11/29/02

BlackBerry Wireless Handheld Model No. R6120CN

SAM 2; Left Hand

Probe: ET3DV6 - SN1644; ConvF(5.40,5.40,5.40); Crest factor: 1.0; Head 1900 MHz: $\sigma = 1.44$ mho/m $\epsilon_r = 38.2$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 0.453 mW/g, SAR (1g): 0.246 mW/g, SAR (10g): 0.135 mW/g, (Worst-case extrapolation)

Penetration depth: 9.2 (8.1, 11.2) [mm]

Powerdrift: 0.44 dB

Tilted left

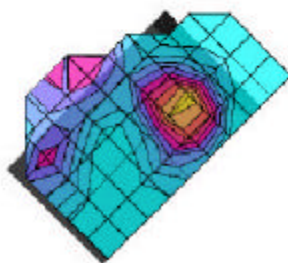
PCS band

Channel: 600

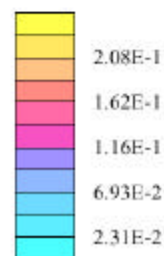
Tested on Nov. 29, 2002

Ambient temperature: 24.1 deg. cel.

Liquid temperature: 22.5 deg. cel.



SAR_{tot} [mW/g]





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295 Phillip Street
Waterloo, Ontario
Canada N2L 3W8
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E-mail: info@rim.net

11/29/02

BlackBerry Wireless Handheld Model No. R6120CN

SAM 2; Right Hand

Probe: ET3DV6 - SN1644; ConvF(5.40,5.40,5.40); Crest factor: 1.0; Head 1900 MHz: $\sigma = 1.44$ mho/m $\epsilon_r = 38.2$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 0.839 mW/g, SAR (1g): 0.443 mW/g, SAR (10g): 0.225 mW/g, (Worst-case extrapolation)

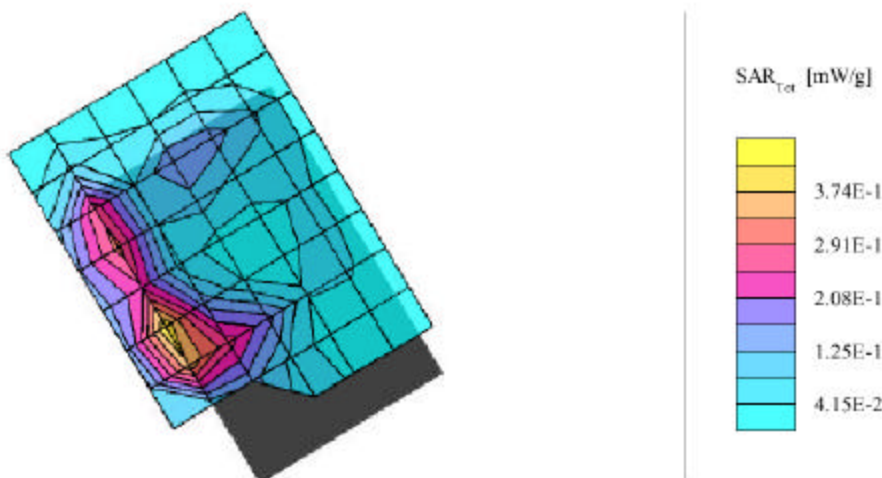
Penetration depth: 9.5 (8.8, 10.7) [mm]

Powerdrift: -0.19 dB

Date: November 28, 2002

Ambient temperature: 24.0 deg. cel.

Liquid temperature: 23.1 deg. cel.





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11/29/02

BlackBerry Wireless Handheld Model No. R6120CN

SAM 2; Right Hand

Probe: ET3DV6 - SN1644; ConvF(5.40,5.40,5.40); Crest factor: 1.0; Head 1900 MHz: $\sigma = 1.44$ mho/m $\epsilon_r = 38.2$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 0.421 mW/g, SAR (1g): 0.218 mW/g, SAR (10g): 0.110 mW/g, (Worst-case extrapolation)

Penetration depth: 8.0 (7.5, 9.0) [mm]

Powerdrift: -0.44 dB

Tilted right

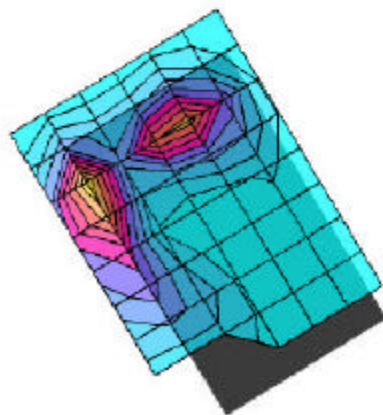
PCS band

Channel: 1175

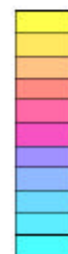
Tested on Nov. 29, 2002

Ambient temperature: 24.0 deg. cel.

Liquid temperature: 23.1 deg. cel.



SAR_{tot} [mW/g]



2.20E-1

1.71E-1

1.22E-1

7.32E-2

2.44E-2



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01/07/03

BlackBerry Wireless Handheld Model No. R6120CN

SAM 2; Flat

Probe: ET3DV6 - SN1644; ConvF(6.40,6.40,6.40); Crest factor: 1.0; Muscle 835 MHz: $\sigma = 0.99$ mho/m $\epsilon_r = 56.1$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 0.851 mW/g, SAR (1g): 0.609 mW/g, SAR (10g): 0.438 mW/g, (Worst-case extrapolation)

Penetration depth: 16.8 (15.0, 18.5) [mm]

Powerdrift: -0.12 dB

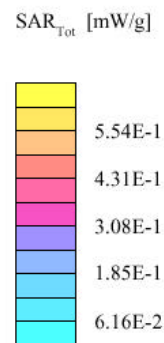
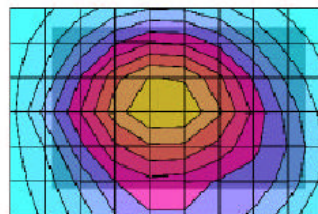
Body-worn with holster

Low channel: 1013

Tested on January 7th, 2003

Ambient temperature: 23.7 deg. cel.

Liquid temperature: 22.8 deg. cel.





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Waterloo, Ontario
Canada N2L 3W8
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12/02/02

BlackBerry Wireless Handheld Model No. R6120CN

SAM 2; Flat

Probe: ET3DV6 - SN1644; ConvF(5.10,5.10,5.10); Crest factor: 1.0; Muscle 1900 MHz: $\sigma = 1.51 \text{ mho/m}$ $\epsilon_r = 52.0$ $\rho = 1.00 \text{ g/cm}^3$

Cube 5x5x7: Peak: 0.395 mW/g, SAR (1g): 0.228 mW/g, SAR (10g): 0.133 mW/g, (Worst-case extrapolation)

Penetration depth: 9.9 (8.8, 11.5) [mm]

Powerdrift: -0.26 dB

Body worn with holster and headset

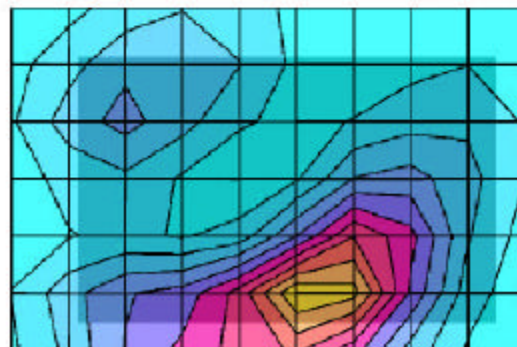
PCS band

Channel: 600

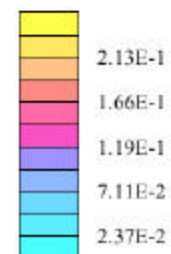
Tested on Dec, 02, 2002

Ambient temperature: 23.8 deg. cel.

Liquid temperature: 22.7 deg. cel.



SAR_{Tot} [mW/g]





Research In Motion Limited
295 Phillip Street
Waterloo, Ontario
Canada N2L 3W8
Tel: +1 519 888 7465, Fax: +1 519 888 6906
E-mail: info@rim.net

12/02/02

BlackBerry Wireless Handheld Model No. R6120CN

SAM 2; Flat

Probe: ET3DV6 - SN1644; ConvF(5.10,5.10,5.10); Crest factor: 1.0; Muscle 1900 MHz: $\sigma = 1.51 \text{ mho/m}$ $\epsilon_r = 52.0$ $\rho = 1.00 \text{ g/cm}^3$

Cube 5x5x7: Peak: 18.2 mW/g, SAR (1g): 8.00 mW/g, SAR (10g): 3.17 mW/g, (Worst-case extrapolation)

Penetration depth: 6.7 (6.0, 8.4) [mm]

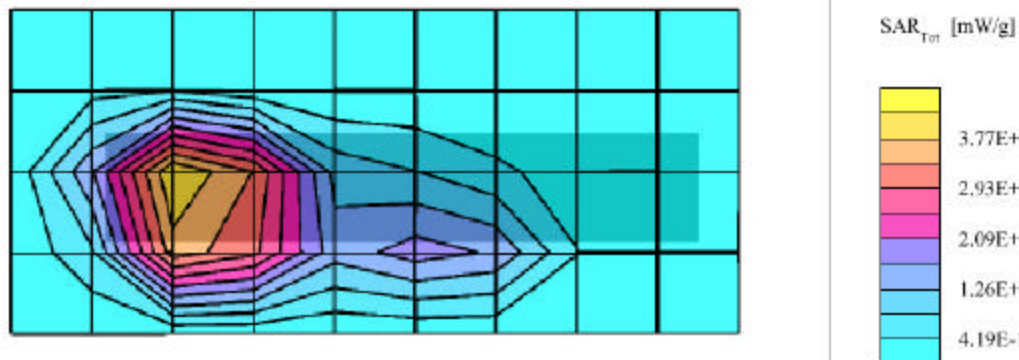
Powerdrift: -0.34 dB

Hand SAR, left edge touching flat phantom

Date: December 02, 2002

Ambient temperature: 23.8 deg. cel.

Liquid temperature: 22.6 deg. cel.



ITEM 7:

The conducted power was measured before each SAR scan. The handheld has two separate RF switches (PCS/Cellular band) for conducted RF power measurement. Two holes were drilled through the back plastic cover in order to be able to connect an RF connector directly to the switches for conducted RF power measurement without disassembling the unit as shown on Figure A. The RF connector is connected to one end of a low-loss cable and the other end to the input of the Agilent E5515C, CDMA Wireless Communication Test Set 8960 Series 10 as shown on Figure B. Rvs Power Control was set to the "All bits up" option for sending out a command to the handheld to transmit at full power at the specified channel.



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Figure A: Back view of handheld with RF switches and connector for conducted power measurement



Figure B: Conducted power measurement set up

I trust that your questions have been fully answered, however if further clarification is required please do not hesitate to contact the undersigned.

Yours truly,

Masud S. Attayi, P.Eng.
Senior Compliance & Certification Engineer
Research In Motion Limited
Tel: +1 519 888-7465 x2442
Fax: +1 519 888-6906
Email: mattayi@rim.net
Web: www.rim.net, www.blackberry.net