

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

8.0 Annexes

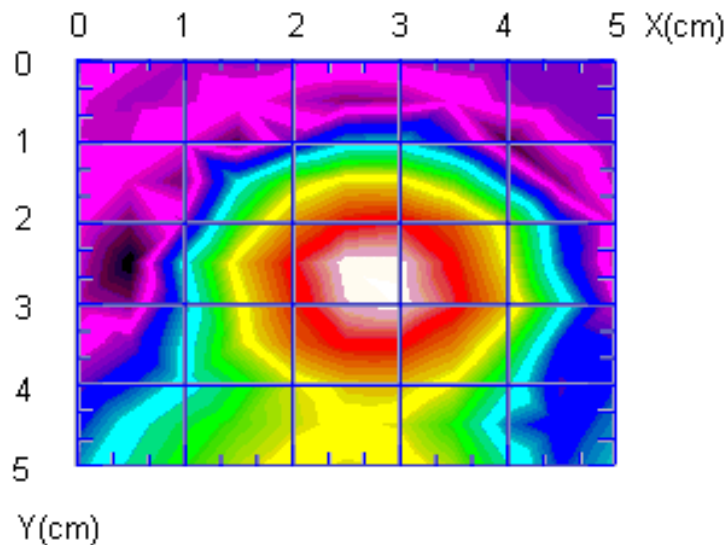
RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
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Annex A: Measurement plots and data

A.1 T-Coil axial data and plot

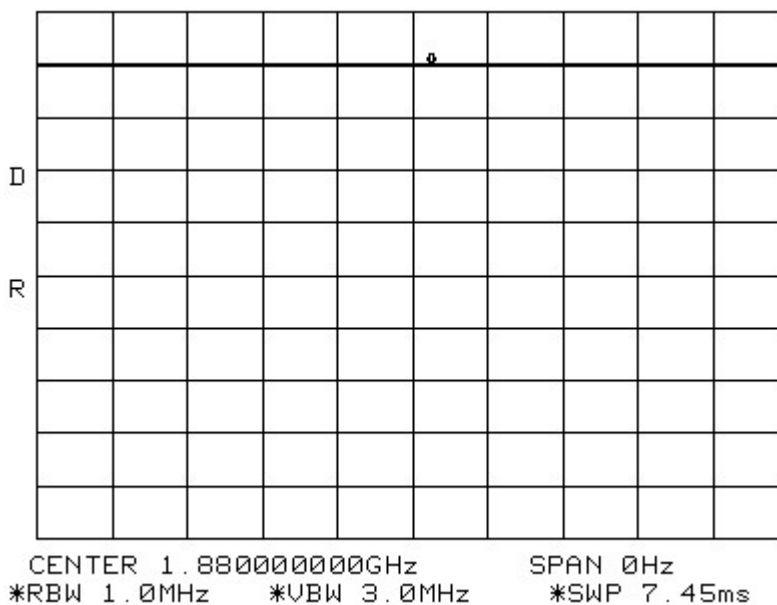
The table and picture below show the audio band magnetic results from the T-Coil scan.

	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0 X-Axis (cm)
0.0	-23.736	-23.17	-23.069	-23.309	-24.142	-25.183	-25.556	-24.131	-21.675	-19.147	-16.909
0.5	-23.188	-22.637	-23.051	-24.783	-26.789	-28.895	-26.768	-21.932	-18.692	-14.896	-13.287
1.0	-22.724	-22.841	-24.509	-26.887	-22.711	-15.067	-17.056	-15.412	-15.048	-11.421	-9.753
1.5	-22.545	-23.704	-27.384	-15.596	-10.03	-3.997	-6.012	-6.879	-10.958	-8.659	-6.994
2.0	-22.627	-25.425	-21.807	-7.853	-1.513	3.884	2.368	0.052	-6.464	-6.621	-5.057
2.5	-22.771	-26.413	-16.703	-4.118	3.428	8.302	7.539	3.947	-3.25	-5.588	-4.106
3.0	-22.748	-26.224	-16.192	-4.346	4.273	8.218	8.524	3.872	-2.817	-6.319	-4.58
3.5	-22.259	-24.447	-20.276	-8.722	0.79	3.61	4.927	-0.324	-5.855	-9.729	-7.268
4.0	-21.885	-22.572	-27.676	-17.888	-6.736	-4.85	-2.566	-8.231	-12.866	-17.4	-13.33
4.5	-21.871	-21.626	-23.787	-26.586	-18.928	-17.87	-13.627	-18.937	-21.118	-19.915	-18.747
5.0	-22.306	-21.64	-21.69	-22.676	-24.829	-25.307	-23.2	-20.528	-18.55	-17.217	-15.822
Y-Axis (cm)											

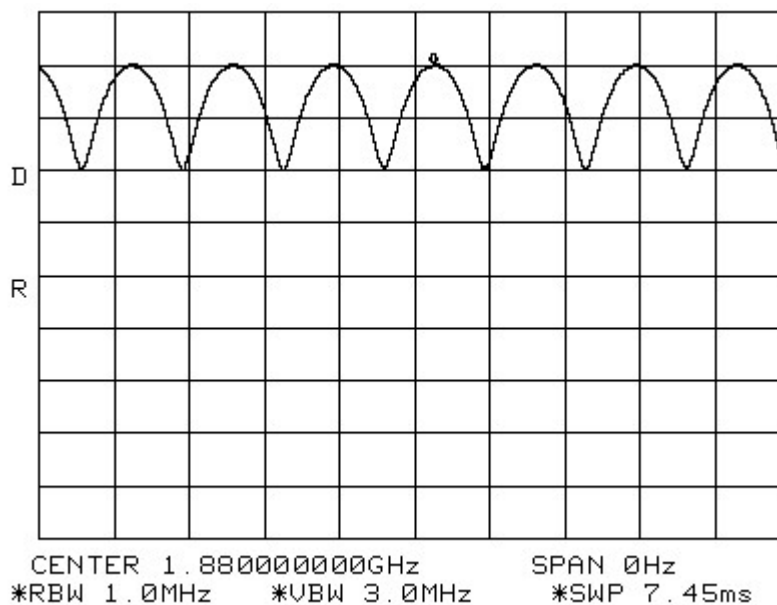


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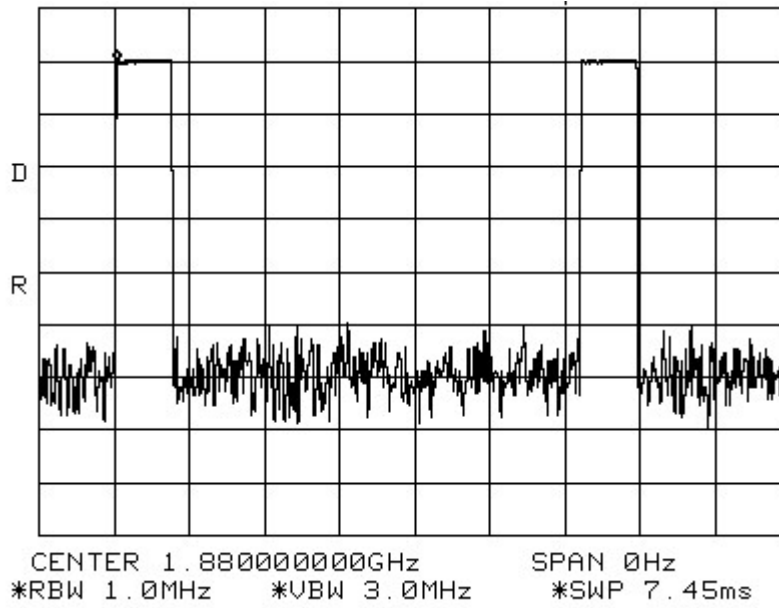
A.2 Spectrum analyser plots: CW, 80% AM and GSM signals



0-Hz span CW plot



0-Hz span 80% AM plot



0-Hz span GSM plot

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A.3 Dipole validation and probe modulation factor plots

Please note that the colours in the contour plots refer to RMS average levels.

Date/Time: 22/06/2005 12:42:44 PM

Test Laboratory: RTS

Dipole validation_CW 1880 MHz_E-Field

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface)Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (5x19x1):

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

Maximum value of Total (measured) = 129.5 V/m

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1):

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

Maximum value of Total field (slot averaged) = 127.5 V/m

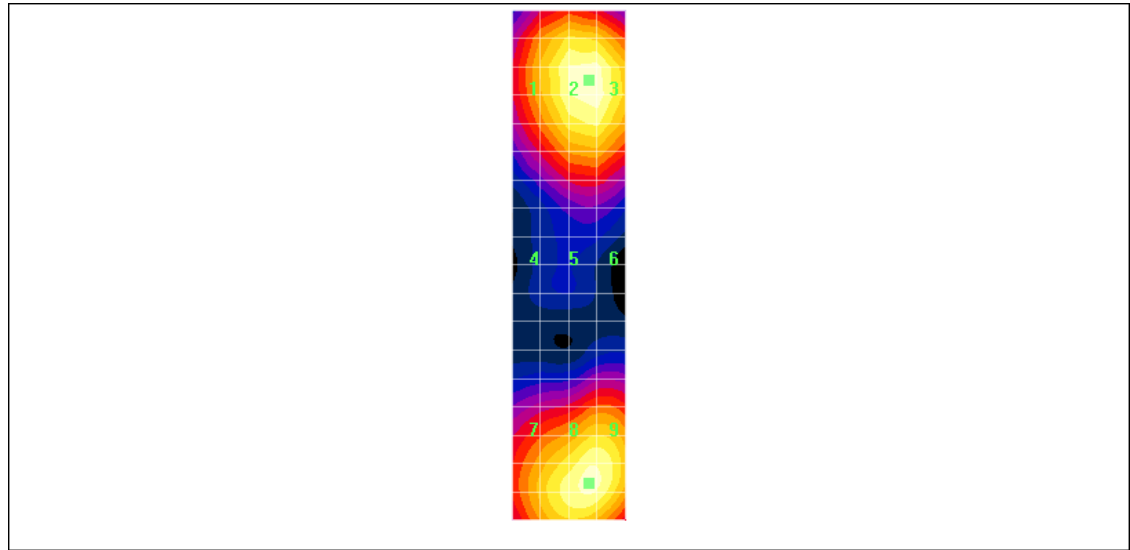
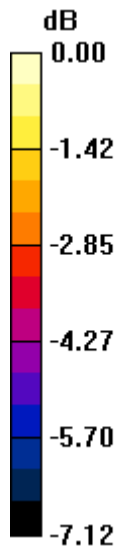
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3
112.2	131.5	131.7
Grid 4	Grid 5	Grid 6
76.9	88.8	88.9
Grid 7	Grid 8	Grid 9
111.7	127.1	127.5

Grid 1	Grid 2	Grid 3
112.2	131.5	131.7
Grid 4	Grid 5	Grid 6
76.9	88.8	88.9
Grid 7	Grid 8	Grid 9
111.7	127.1	127.5

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 131.7V/m

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Test Laboratory: RTS

Dipole validation_ 80 % AM_ 1880 MHz_ E-Field

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (5x19x1):

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

Maximum value of Total (measured) = 80.5 V/m

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1):

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

Maximum value of Total field (slot averaged) = 80.3 V/m

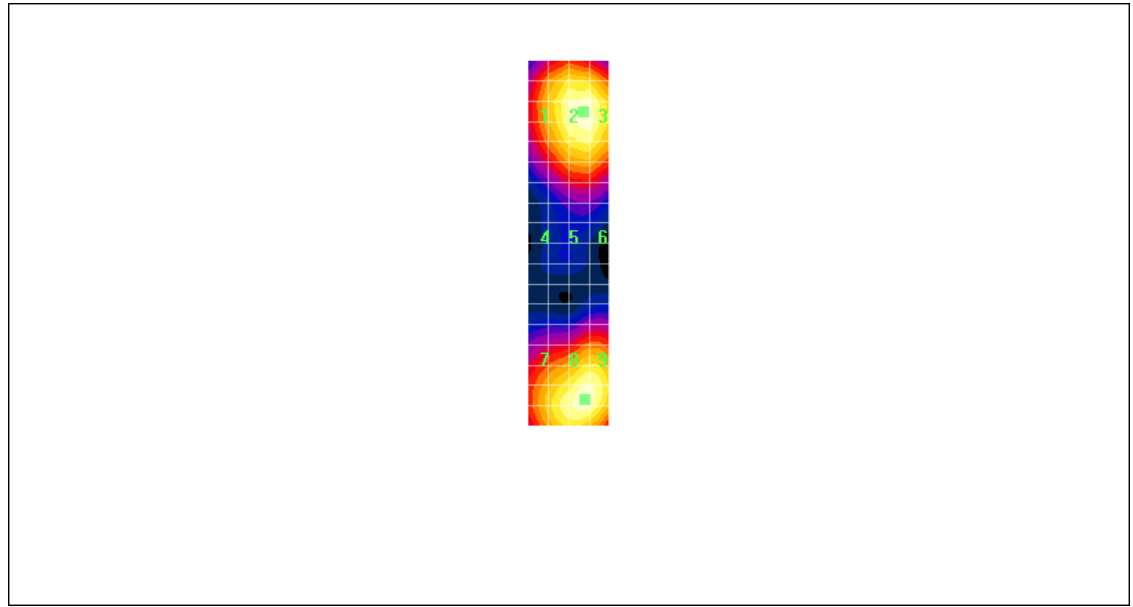
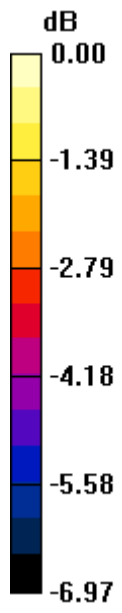
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3
70.3	81.6	81.8
Grid 4	Grid 5	Grid 6
48.8	56.0	56.0
Grid 7	Grid 8	Grid 9
70.5	79.9	80.3

Grid 1	Grid 2	Grid 3
70.3	81.6	81.8
Grid 4	Grid 5	Grid 6
48.8	56.0	56.0
Grid 7	Grid 8	Grid 9
70.5	79.9	80.3

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 81.8V/m

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Test Laboratory: RTS

Dipole validation_ GSM 1880 MHz_E-Field

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (5x19x1):

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

Maximum value of Total (measured) = 45.8 V/m

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1):

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

Maximum value of Total field (slot averaged) = 132.4 V/m

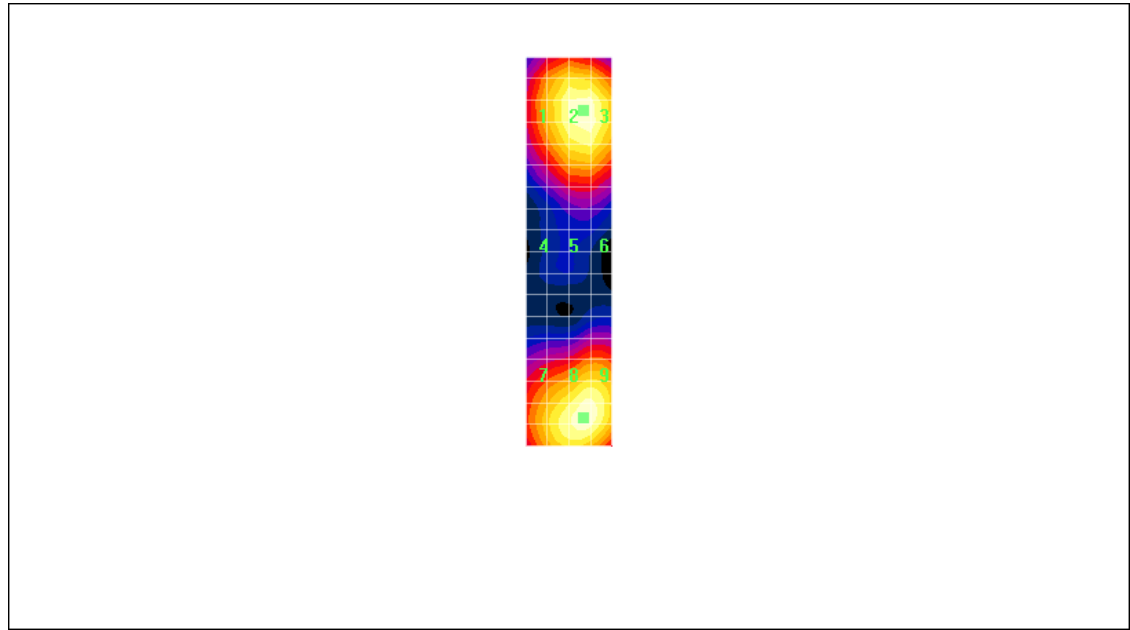
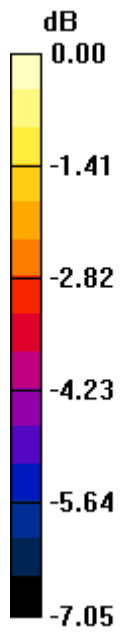
Hearing Aid Near-Field Category: M2 (AWF -5 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3
39.7	46.5	46.6
Grid 4	Grid 5	Grid 6
27.5	31.6	31.6
Grid 7	Grid 8	Grid 9
40.3	45.8	46.0

Grid 1	Grid 2	Grid 3
114.5	134.1	134.3
Grid 4	Grid 5	Grid 6
79.3	91.2	91.2
Grid 7	Grid 8	Grid 9
116.0	132.0	132.5

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 46.6V/m

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Test Laboratory: RTS

HAC_H_Dipole_CW_06-23-2005

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004

- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)

- Electronics: DAE3 Sn472; Calibrated: 03/01/2005

- Phantom: HAC Test Arch; Type: SD HAC P01 BA;

- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (5x19x1):

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

Maximum value of Total (measured) = 0.401 A/m

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1):

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

Maximum value of Total field (slot averaged) = 0.401 A/m

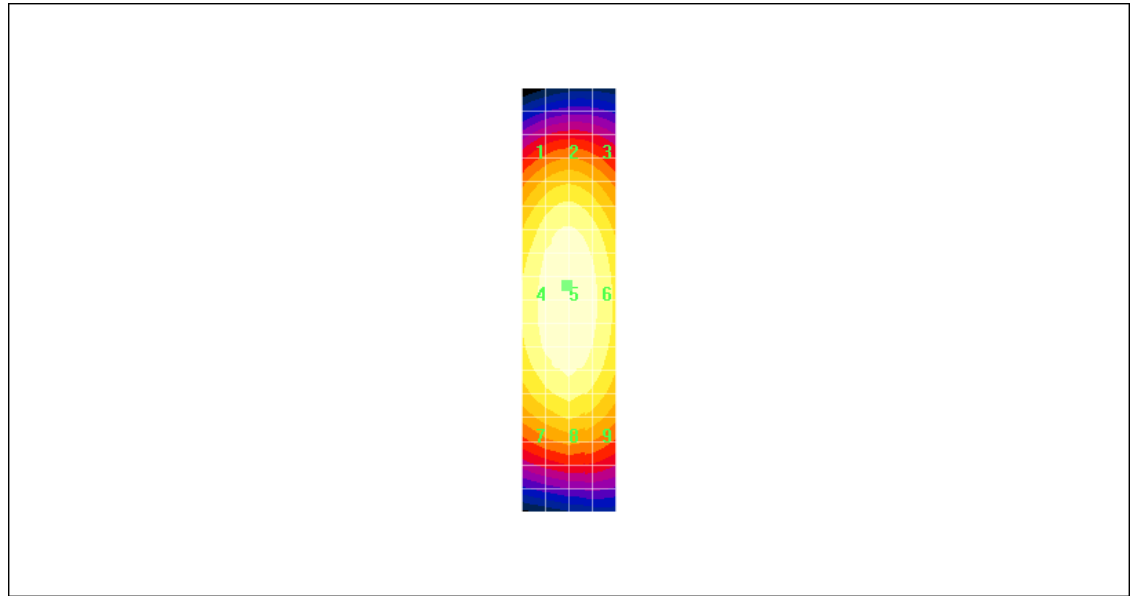
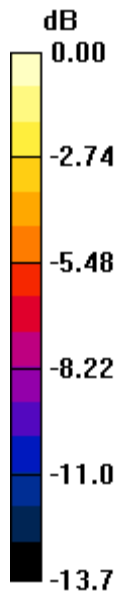
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3
0.347	0.362	0.347
Grid 4	Grid 5	Grid 6
0.386	0.401	0.384
Grid 7	Grid 8	Grid 9
0.352	0.370	0.354

Grid 1	Grid 2	Grid 3
0.347	0.362	0.347
Grid 4	Grid 5	Grid 6
0.386	0.401	0.384
Grid 7	Grid 8	Grid 9
0.352	0.370	0.354

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.401A/m

Date/Time: 23/06/2005 12:07:27 PM

Test Laboratory: RTS

HAC_H_Dipole_AM80%_06-23-2005

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (5x19x1):

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

Maximum value of Total (measured) = 0.260 A/m

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1):

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

Maximum value of Total field (slot averaged) = 0.260 A/m

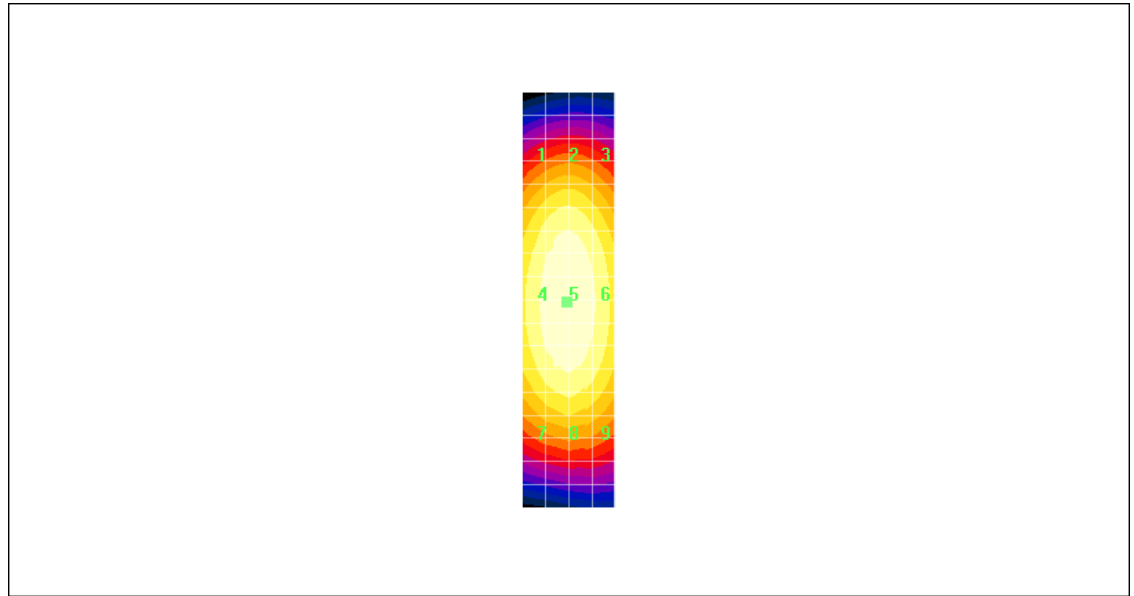
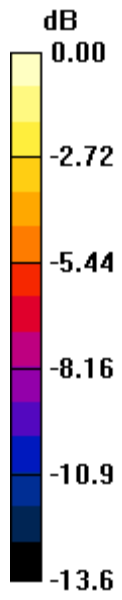
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3
0.223	0.233	0.222
Grid 4	Grid 5	Grid 6
0.250	0.260	0.248
Grid 7	Grid 8	Grid 9
0.229	0.239	0.228

Grid 1	Grid 2	Grid 3
0.223	0.233	0.222
Grid 4	Grid 5	Grid 6
0.250	0.260	0.248
Grid 7	Grid 8	Grid 9
0.229	0.239	0.228

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.260A/m

Date/Time: 23/06/2005 12:15:06 PM

Test Laboratory: RTS

HAC_H_Dipole_GSM1880_06-23-2005

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (5x19x1):

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

Maximum value of Total (measured) = 0.159 A/m

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1):

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

Maximum value of Total field (slot averaged) = 0.458 A/m

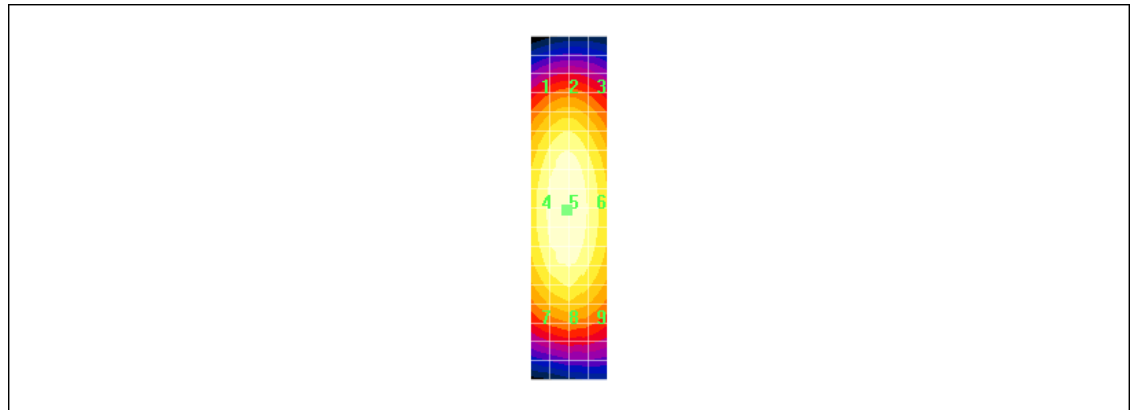
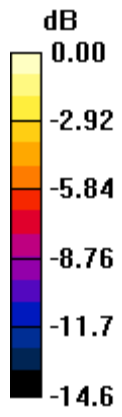
Hearing Aid Near-Field Category: M1 (AWF -5 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3
0.133	0.141	0.131
Grid 4	Grid 5	Grid 6
0.151	0.159	0.148
Grid 7	Grid 8	Grid 9
0.137	0.144	0.134

Grid 1	Grid 2	Grid 3
0.383	0.405	0.377
Grid 4	Grid 5	Grid 6
0.436	0.458	0.425
Grid 7	Grid 8	Grid 9
0.394	0.415	0.385

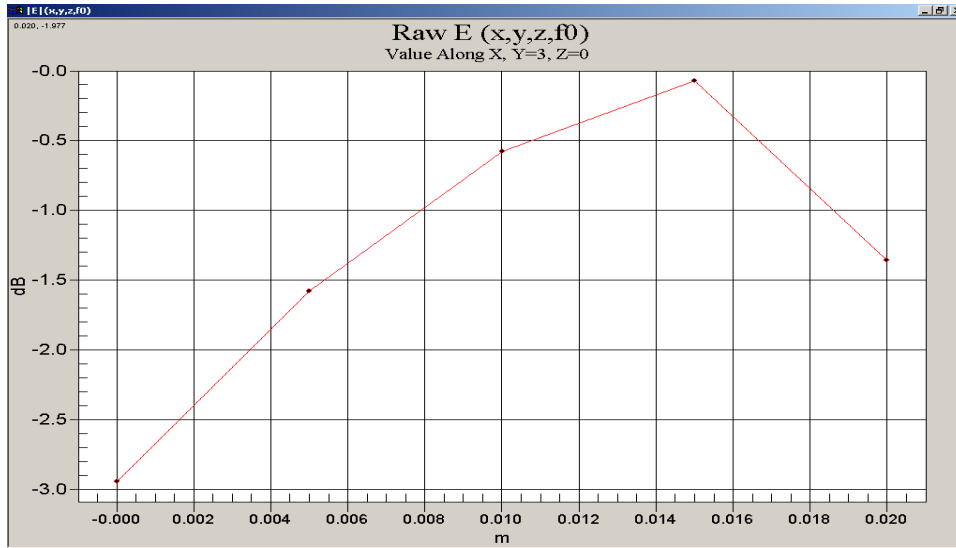
Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



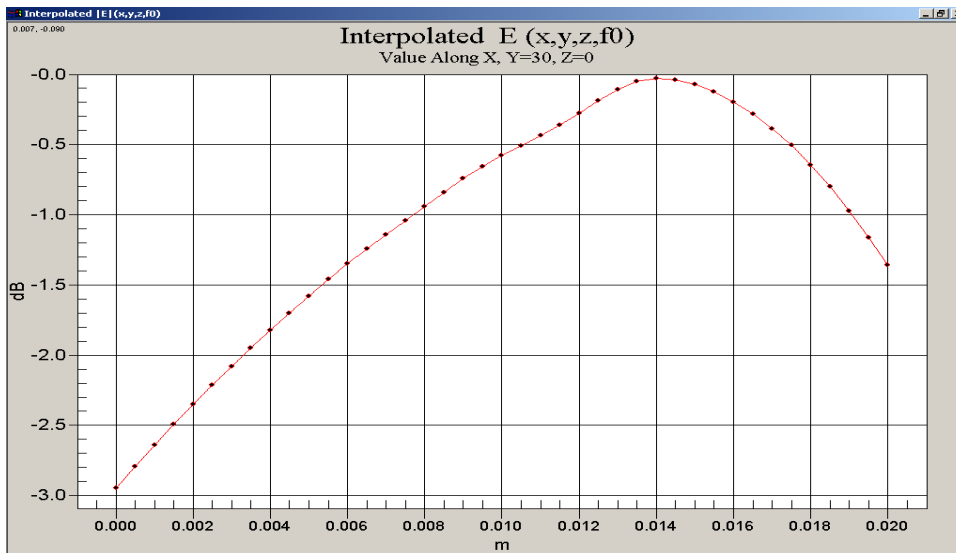
0 dB = 0.159A/m

Justification of Step Size and Interpolation

This section demonstrates that a 5mm step size with interpolation provides sufficient resolution for RF emissions measurements. The DASY 4 uses interpolation algorithms to derive 9 interpolated points between every measured point.

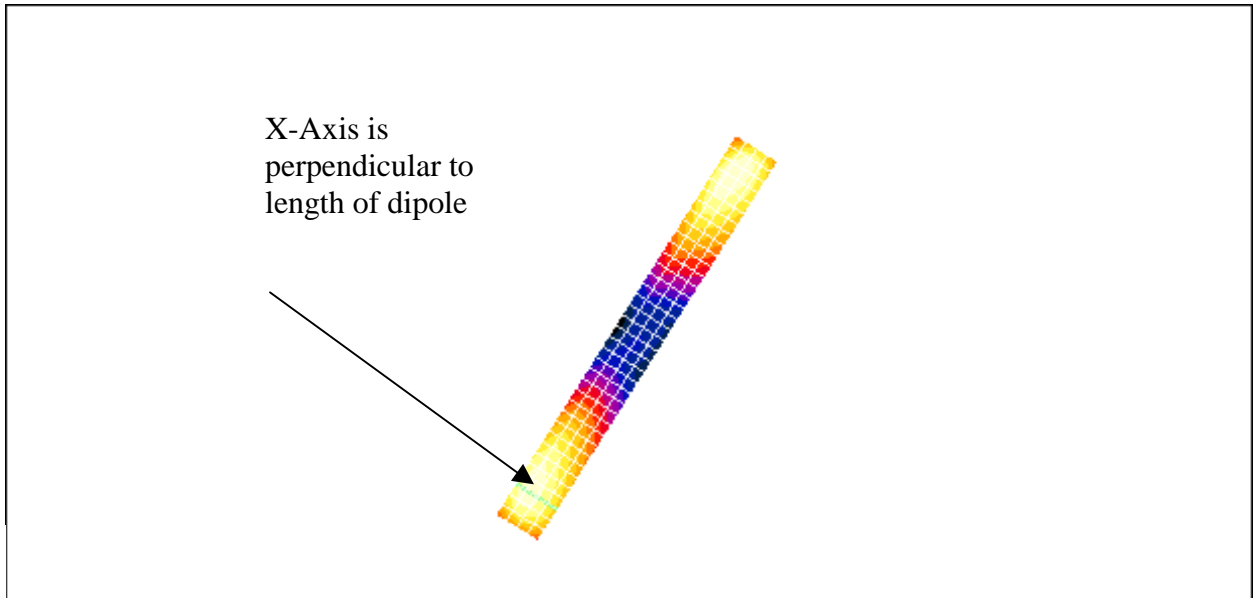


The figure above shows the raw measured field strength perpendicular to the length of the validation dipole. The TCB guidance slides require the 3dB width to be much larger than the step size. The width between -3dB points is >21mm, at least 4 times the step size.



This figure shows the interpolated field strength perpendicular to the dipole. The interpolated points follow the raw points with no inconsistencies.

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The green line in this figure shows the axis along which the points lie.

Further proof of 5mm size:

An additional set of measurements was taken: dipole validations were performed using 5mm and 2mm step sizes. The difference between the two readings is insignificant for both field types (<0.2% for E and 0% for H), demonstrating that 5mm is sufficient. The plots follow.

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Date/Time: 14/07/2005 11:35:24 AM

Lab: RIM Testing Services (RTS)

Dipole Validation 1880 MHz_E-Field 07_14_05

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
 Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2285; ConvF(1, 1, 1); Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (5x19x1):

Measurement grid: dx=5mm, dy=5mm
 Maximum value of Total (measured) = 134.8 V/m

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm
 Maximum value of Total field (slot averaged) = 131.0 V/m

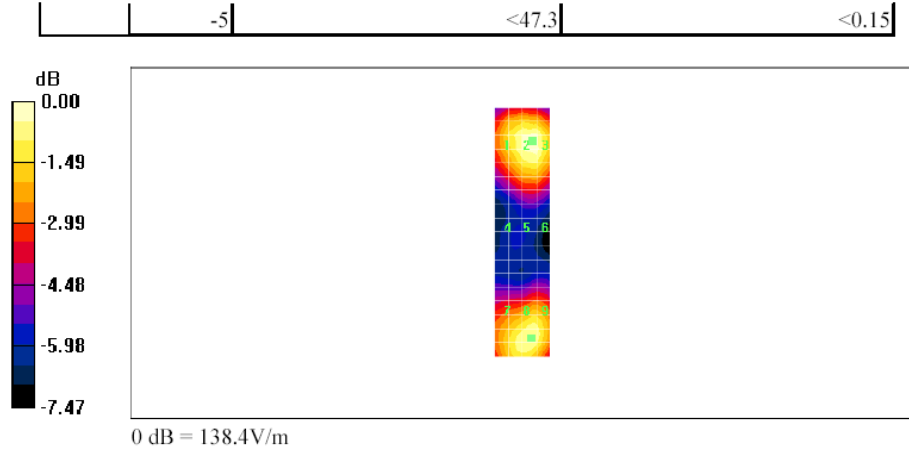
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
123.2	138.1	138.4	123.2	138.1	138.4
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
80.9	92.3	92.2	80.9	92.3	92.2
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
119.8	131.0	130.7	119.8	131.0	130.7

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19

file://C:\Program%20Files\DASY4\Print_Templates\Dipole%20Validation%201880%20... 14/07/2005



RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

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Date/Time: 14/07/2005 11:44:51 AM

Lab: RIM Testing Services (RTS)

Dipole Validation 1880 MHz_2mm step_E-Field 07_14_05

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
 Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2285; ConvF(1, 1, 1); Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (11x46x1):

Measurement grid: dx=2mm, dy=2mm
 Maximum value of Total (measured) = 138.0 V/m

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (101x451x1):

Measurement grid: dx=2mm, dy=2mm
 Maximum value of Total field (slot averaged) = 131.2 V/m

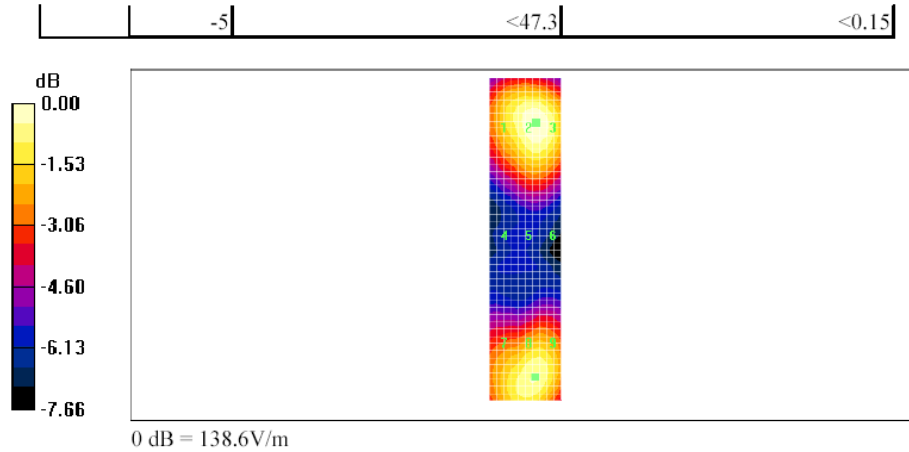
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
123.1	138.6	138.6	123.1	138.6	138.6
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
81.4	92.1	91.6	81.4	92.1	91.6
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
121.3	131.2	131.0	121.3	131.2	131.0

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19

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RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

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Date/Time: 14/07/2005 12:43:02 PM

Lab: RIM Testing Services (RTS)

HAC_H_Dipole_CW 1880_5 mm step_07_14_05

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (5x19x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of Total (measured) = 0.406 A/m

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of Total field (slot averaged) = 0.406 A/m

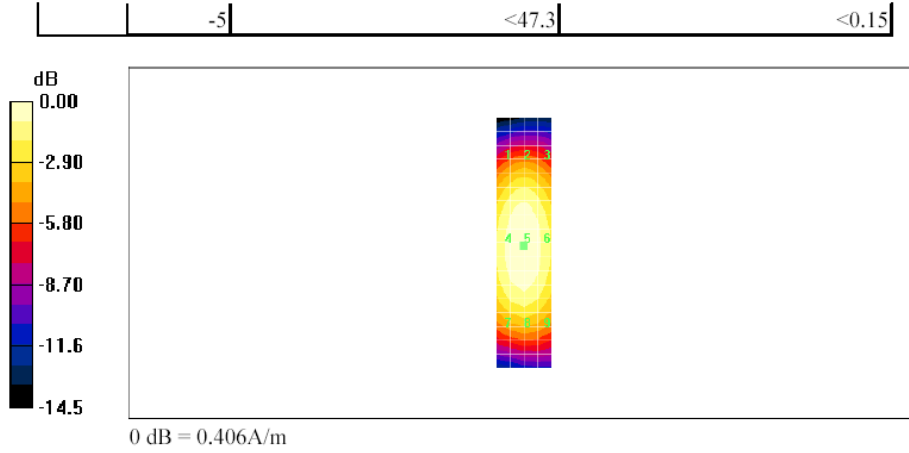
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.342	0.359	0.344	0.342	0.359	0.344
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.389	0.406	0.389	0.389	0.406	0.389
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.363	0.378	0.363	0.363	0.378	0.363

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19

file://C:\Program%20Files\DASY4\Print_Templates\HAC_H_Dipole_CW%201880_5%... 14/07/2005



RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

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Date/Time: 14/07/2005 12:53:40 PM

Lab: RIM Testing Services (RTS)

HAC_H_Dipole_CW 1880_2 mm step_07_14_05

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (11x46x1):

Measurement grid: dx=2mm, dy=2mm
Maximum value of Total (measured) = 0.406 A/m

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (101x451x1):

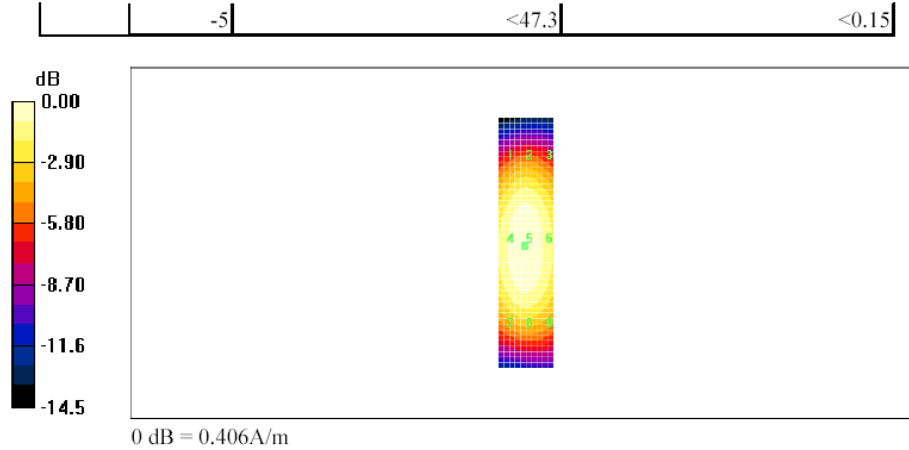
Measurement grid: dx=2mm, dy=2mm
Maximum value of Total field (slot averaged) = 0.406 A/m
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.347	0.361	0.348	0.347	0.361	0.348
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.394	0.406	0.391	0.394	0.406	0.391
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.367	0.380	0.365	0.367	0.380	0.365

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19

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RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

A.4 RF emission field plots

Please note that the colours in the contour plots refer to RMS average levels.

For plots where the probe was rotated, an 'X' marks the location of rotation.

Date/Time: 22/06/2005 3:28:56 PM

Lab: RIM Testing Services (RTS)

BB 7290 Model RAP40GW_GSM 1900_Low Channel_Speaker Center_E-Field

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:7.99

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 30.3 V/m

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 75.2 V/m

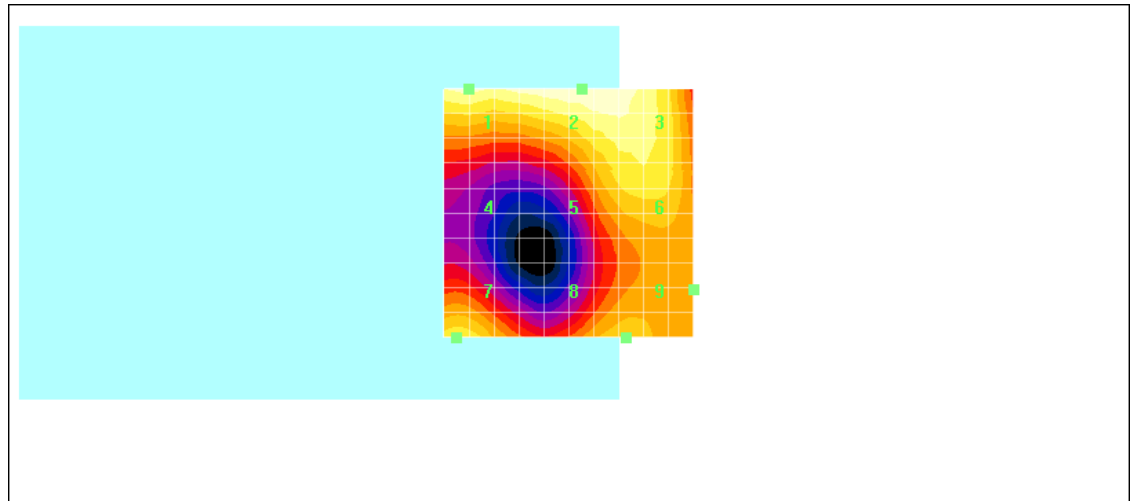
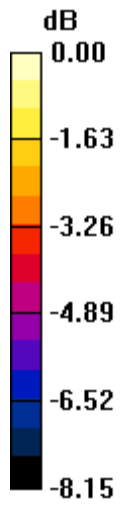
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3
29.4	30.3	29.8
Grid 4	Grid 5	Grid 6
19.1	25.0	26.6
Grid 7	Grid 8	Grid 9
26.5	24.3	24.6

Grid 1	Grid 2	Grid 3
83.1	85.6	84.2
Grid 4	Grid 5	Grid 6
54.0	70.7	75.2
Grid 7	Grid 8	Grid 9
74.9	68.7	69.5

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 30.3V/m

Date/Time: 23/06/2005 7:34:44 AM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Middle Channel_Speaker Center_E-Field
06_23_05

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:7.99

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 28.4 V/m

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 78.0 V/m

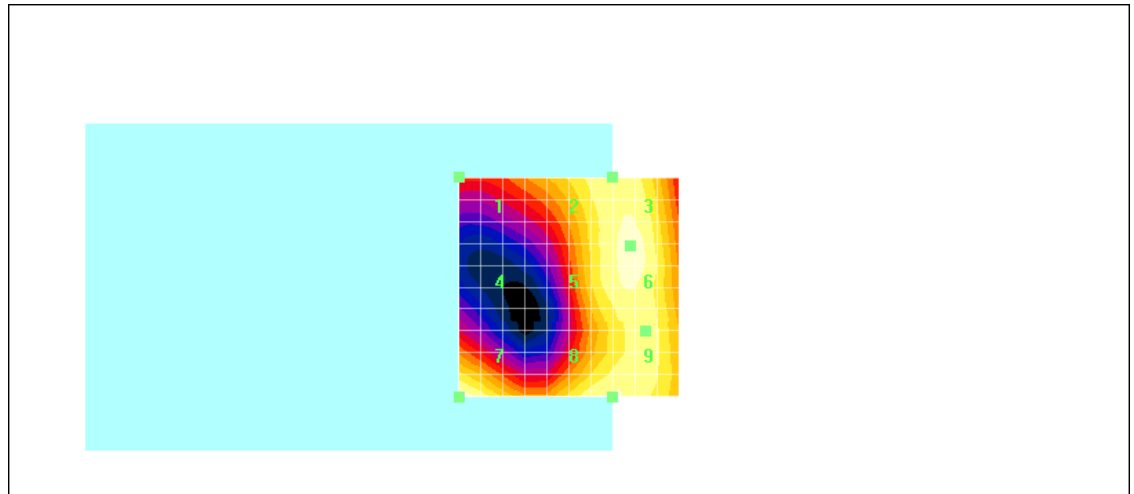
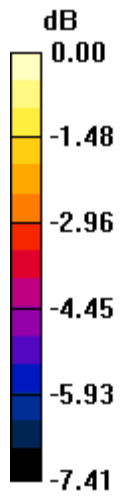
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3
21.6	26.3	27.6
Grid 4	Grid 5	Grid 6
17.4	25.8	27.6
Grid 7	Grid 8	Grid 9
28.4	27.1	27.2

Grid 1	Grid 2	Grid 3
61.0	74.3	78.0
Grid 4	Grid 5	Grid 6
49.2	72.9	78.0
Grid 7	Grid 8	Grid 9
80.3	76.6	76.9

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 28.4V/m

Date/Time: 23/06/2005 7:45:23 AM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_High Channel_Speaker Center_E-Field
06_23_05

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:7.99

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 22.2 V/m

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 57.9 V/m

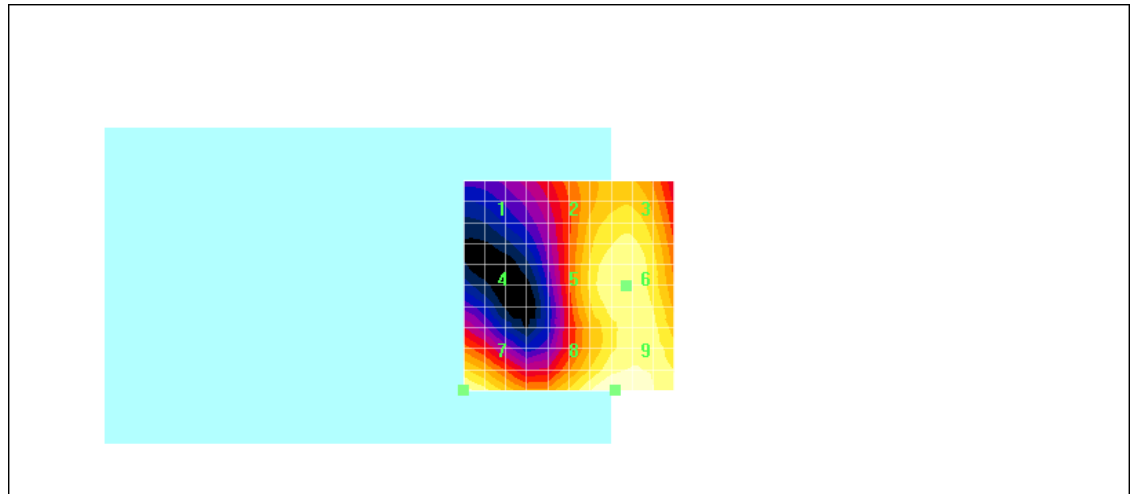
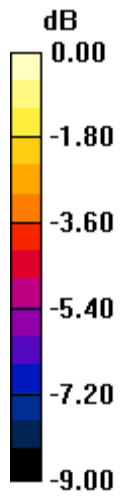
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3
12.6	19.0	19.9
Grid 4	Grid 5	Grid 6
12.1	19.7	20.5
Grid 7	Grid 8	Grid 9
21.6	21.8	22.2

Grid 1	Grid 2	Grid 3
35.6	53.7	56.2
Grid 4	Grid 5	Grid 6
34.2	55.7	57.9
Grid 7	Grid 8	Grid 9
61.0	61.6	62.7

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 22.2V/m

Date/Time: 23/06/2005 8:32:46 AM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Low Channel_T_Coil Center_E-Field

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:7.99

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 31.6 V/m

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 78.3 V/m

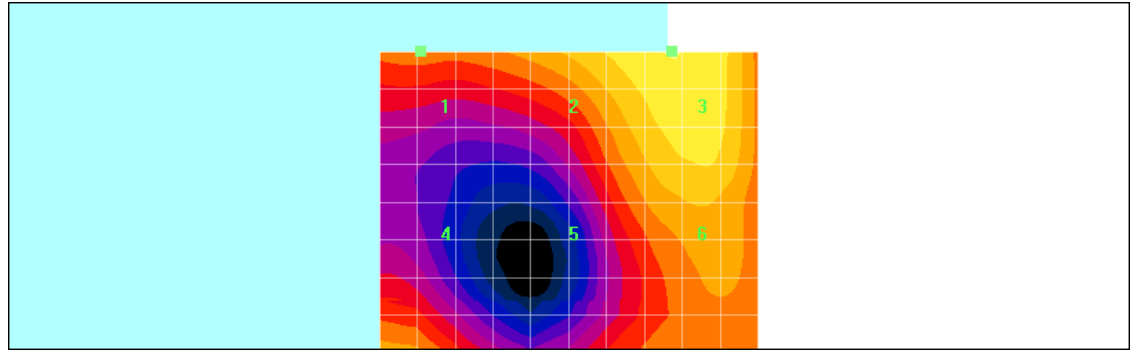
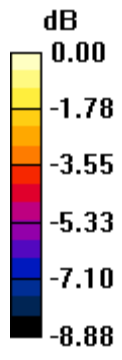
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3
22.5	26.9	27.7
Grid 4	Grid 5	Grid 6
19.9	22.4	25.5
Grid 7	Grid 8	Grid 9
31.7	25.4	25.3

Grid 1	Grid 2	Grid 3
63.6	76.0	78.3
Grid 4	Grid 5	Grid 6
56.2	63.3	72.0
Grid 7	Grid 8	Grid 9
89.6	71.8	71.5

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 31.7V/m

Date/Time: 23/06/2005 8:19:27 AM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Middle Channel_T_Coil Center_E-Field
06_23_05

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:7.99

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 34.1 V/m

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 79.7 V/m

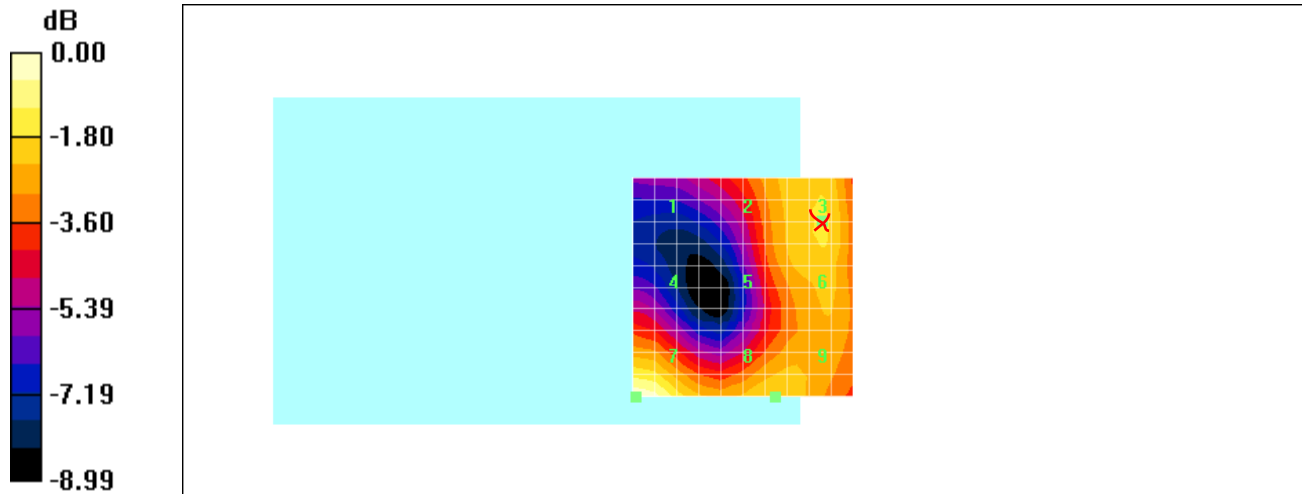
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

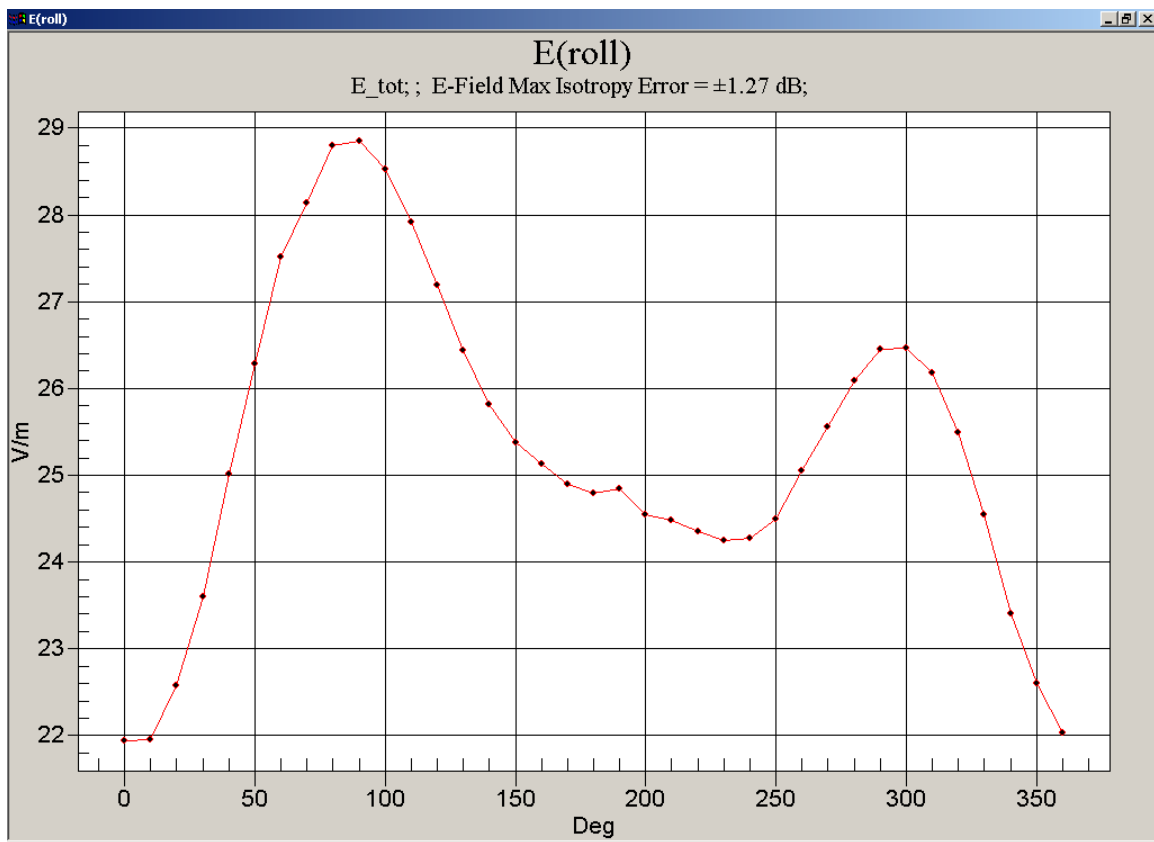
Grid 1	Grid 2	Grid 3
19.6	26.1	28.2
Grid 4	Grid 5	Grid 6
21.1	24.8	27.7
Grid 7	Grid 8	Grid 9
34.2	27.7	27.7

Grid 1	Grid 2	Grid 3
55.4	73.8	79.7
Grid 4	Grid 5	Grid 6
59.6	70.1	78.3
Grid 7	Grid 8	Grid 9
96.6	78.3	78.3

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 34.2V/m



Peak after Rotation = $E_{roll_max} \times PMF$
 = 28.88×2.826
 = $81.6V/m$

Power Drift for worst-case E-field scan

The screenshot displays the DASYS4 software interface. The main window shows a 3D model of a robot with a yellow body and red legs, positioned on a white surface. The robot is labeled 'FieldReference'. The interface includes a menu bar (File, Edit, View, Tools, Window, Help), a toolbar, and a 'Locked Setup' panel. The 'Locked Setup' panel lists various components and their status:

Component	Status
Server	
DAE3 Sn472	
ER3DV6 - SN2286	Not installed
Bigfoot RX90L	Lefty-Above-NoFlip
HAC Test Arch...	Not installed
Air	Not installed
BlackBerry Wir...	
GSM 1900	Not installed
DASY4 (High Pr...	ANSI-C63.19 Hearing Aid Compatibility

The 'HAC E Device' panel shows the following test results:

Test Name	Result
Power Reference Measurement	100% done, 21.28 V/m
Hearing Aid Compatibility Test	100% done, Max (interp.) = 34.16 V/m
Power Drift Measurement	100% done, 21.04 V/m, -0.0962 dB
Robot Command (Interpolated maximum of 'E Scan 10mm above Device Reference/Hearin	
Rotation (1D) 2	100% done, 33.2 V/m ±0.6 dB
Robot Command 2 (Section park)	

The 'Messages' panel shows the following log entries:

```
Timeout while waiting for header 21 0.336
*** Watchdog: Communication error
srf: 0.3%
Initial message from ES received, communication starting up
*** Probe collision
Probe: 1
```

Date/Time: 23/06/2005 8:41:18 AM

Lab: RIM Testing Services (RTS)

BB 7290 Model RAP40GW_GSM 1900_High Channel_T_Coil Center_E-Field
06_23_05

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:7.99

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 27.6 V/m

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

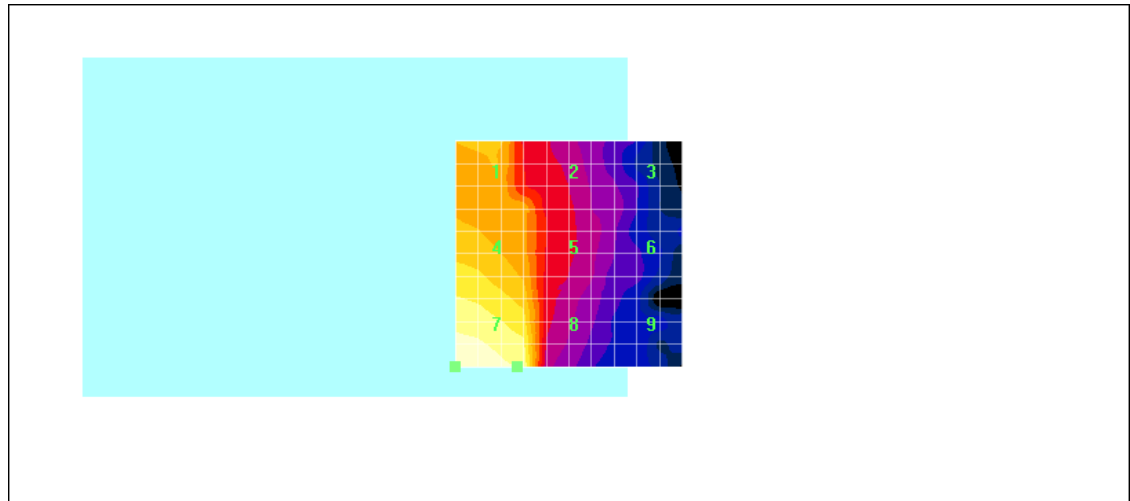
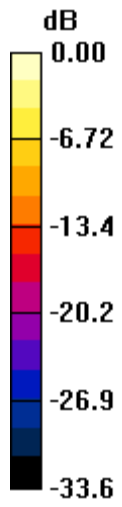
Maximum value of Total field (slot averaged) = 31.4 V/m

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1 11.1	Grid 2 7.35	Grid 3 2.59	Grid 1 31.4	Grid 2 20.8	Grid 3 7.32
Grid 4 15.8	Grid 5 8.16	Grid 6 2.56	Grid 4 44.7	Grid 5 23.1	Grid 6 7.23
Grid 7 27.6	Grid 8 12.2	Grid 9 1.98	Grid 7 78.0	Grid 8 34.5	Grid 9 5.60

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 27.6V/m

Date/Time: 23/06/2005 9:15:42 AM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Middle Channel_T_Coil Center_E-Field_06_23_05_batt 2

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:7.99

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 31.8 V/m

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 78.6 V/m

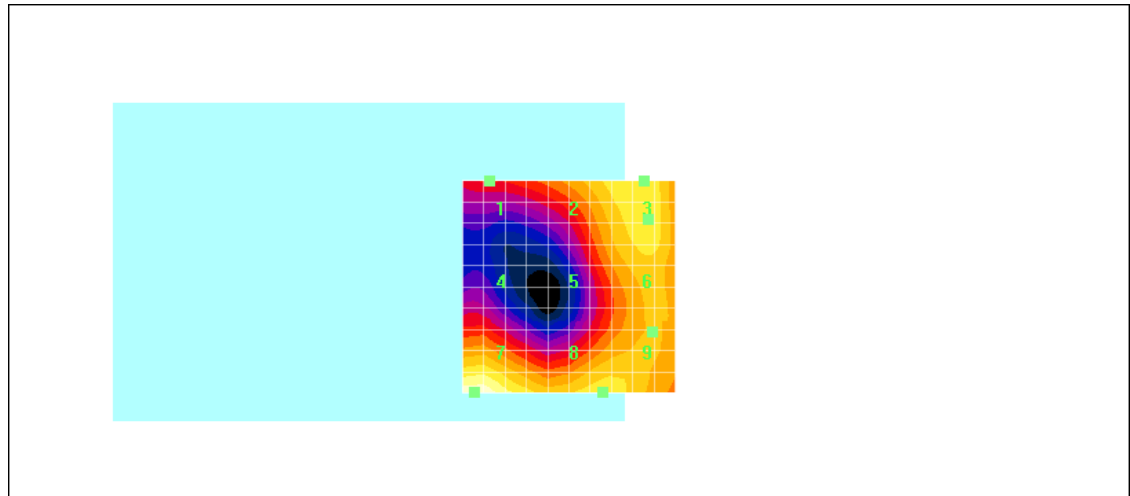
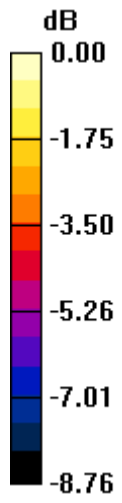
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3
21.2	26.4	27.8
Grid 4	Grid 5	Grid 6
19.8	22.5	26.6
Grid 7	Grid 8	Grid 9
32.1	27.5	27.5

Grid 1	Grid 2	Grid 3
59.9	74.6	78.6
Grid 4	Grid 5	Grid 6
56.0	63.6	75.2
Grid 7	Grid 8	Grid 9
90.7	77.7	77.7

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 32.1V/m

Date/Time: 23/06/2005 9:28:02 AM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Middle Channel_T_Coil Center_E-Field_06_23_05_batt 3

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:7.99

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 29.3 V/m

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 74.6 V/m

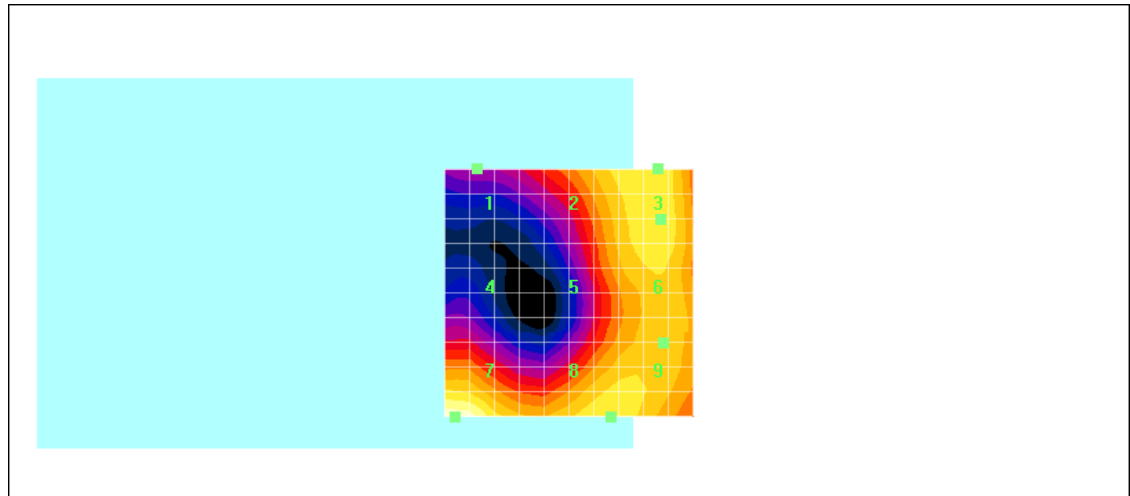
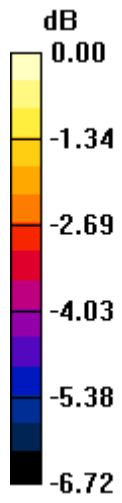
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3
19.6	25.2	26.4
Grid 4	Grid 5	Grid 6
19.1	23.0	25.9
Grid 7	Grid 8	Grid 9
29.4	26.3	26.3

Grid 1	Grid 2	Grid 3
55.4	71.2	74.6
Grid 4	Grid 5	Grid 6
54.0	65.0	73.2
Grid 7	Grid 8	Grid 9
83.1	74.3	74.3

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 29.4V/m

Date/Time: 23/06/2005 9:03:24 AM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Middle Channel_T_Coil Center_E-Field

LCD_2_06_23_05

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:7.99

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 07/01/2005
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 31.0 V/m

E Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 76.3 V/m

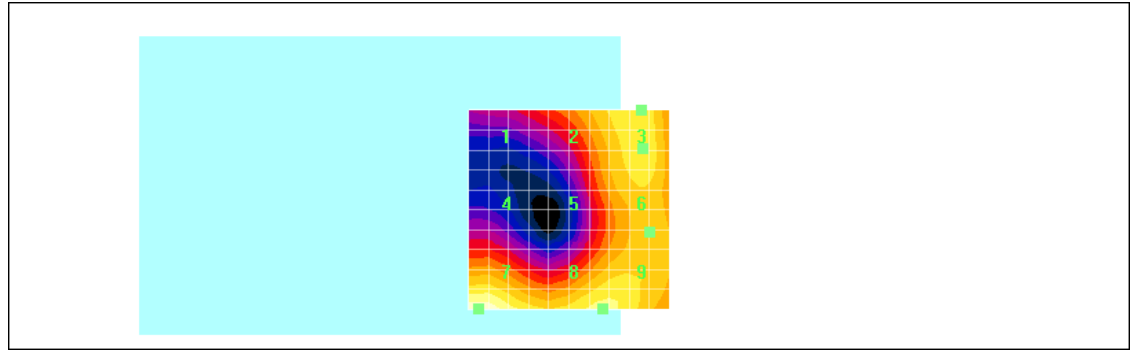
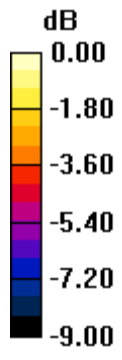
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3
19.2	25.0	27.0
Grid 4	Grid 5	Grid 6
18.6	22.0	26.2
Grid 7	Grid 8	Grid 9
31.4	28.3	28.3

Grid 1	Grid 2	Grid 3
54.3	70.7	76.3
Grid 4	Grid 5	Grid 6
52.6	62.2	74.0
Grid 7	Grid 8	Grid 9
88.7	80.0	80.0

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 31.4V/m

Date/Time: 23/06/2005 2:14:04 PM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Low Channel_Speaker Center_H-Field

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:6.35

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface)Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 0.097 A/m

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 0.230 A/m

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

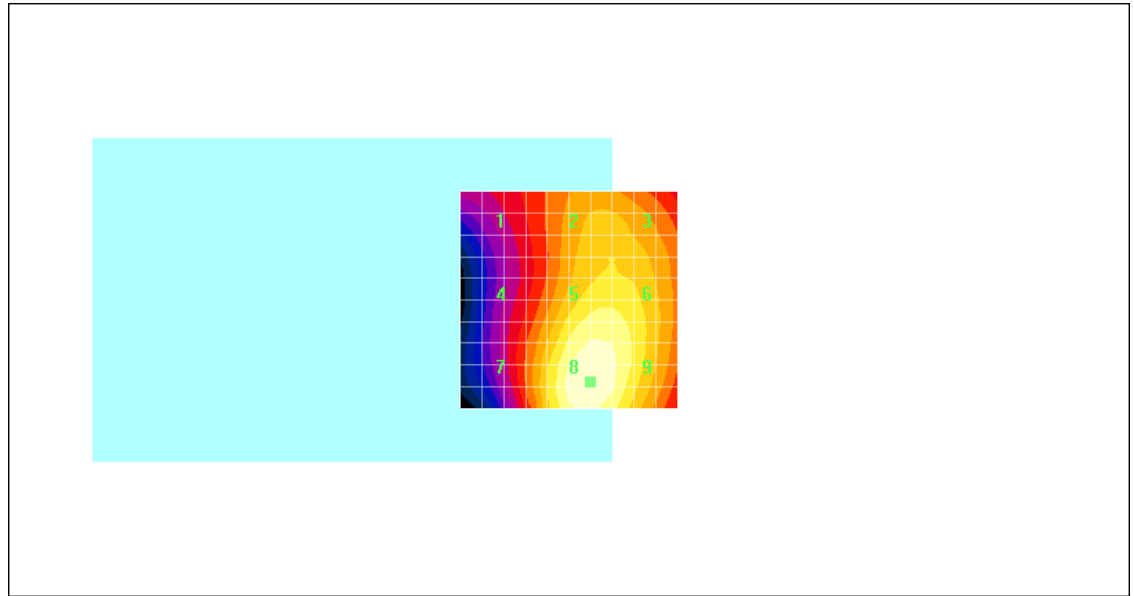
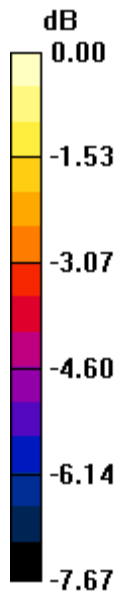
H in A/m (Time averaged)

H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3
0.066	0.081	0.082
Grid 4	Grid 5	Grid 6
0.069	0.091	0.091
Grid 7	Grid 8	Grid 9
0.071	0.097	0.095

Grid 1	Grid 2	Grid 3
0.165	0.204	0.206
Grid 4	Grid 5	Grid 6
0.173	0.230	0.229
Grid 7	Grid 8	Grid 9
0.180	0.245	0.239

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.097A/m

Date/Time: 23/06/2005 2:23:46 PM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Mid Channel_Speaker Center_H-Field

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:6.35

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 0.092 A/m

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 0.217 A/m

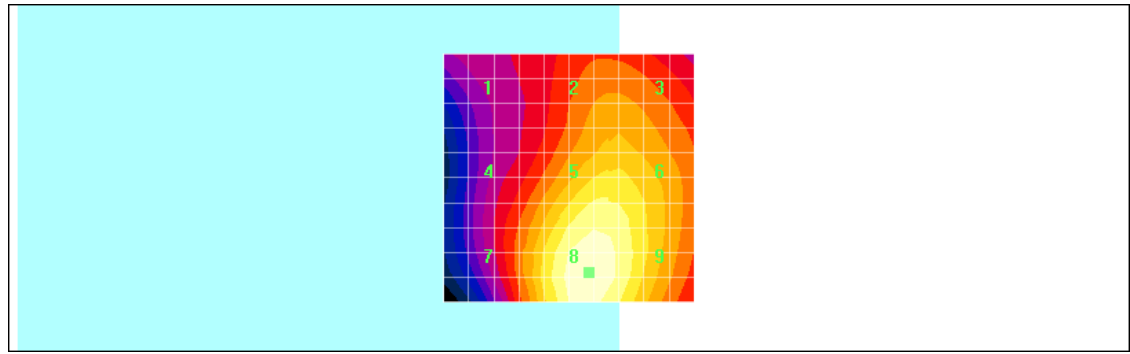
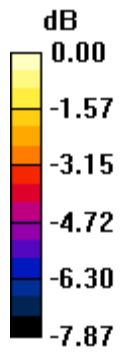
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3
0.058	0.073	0.073
Grid 4	Grid 5	Grid 6
0.066	0.086	0.085
Grid 7	Grid 8	Grid 9
0.069	0.093	0.089

Grid 1	Grid 2	Grid 3
0.146	0.183	0.184
Grid 4	Grid 5	Grid 6
0.166	0.217	0.215
Grid 7	Grid 8	Grid 9
0.175	0.234	0.225

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.093A/m

Date/Time: 23/06/2005 2:46:55 PM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_High Channel_Speaker Center_H-Field

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:6.35

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004

- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)

- Electronics: DAE3 Sn472; Calibrated: 03/01/2005

- Phantom: HAC Test Arch; Type: SD HAC P01 BA;

- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 0.075 A/m

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 0.161 A/m

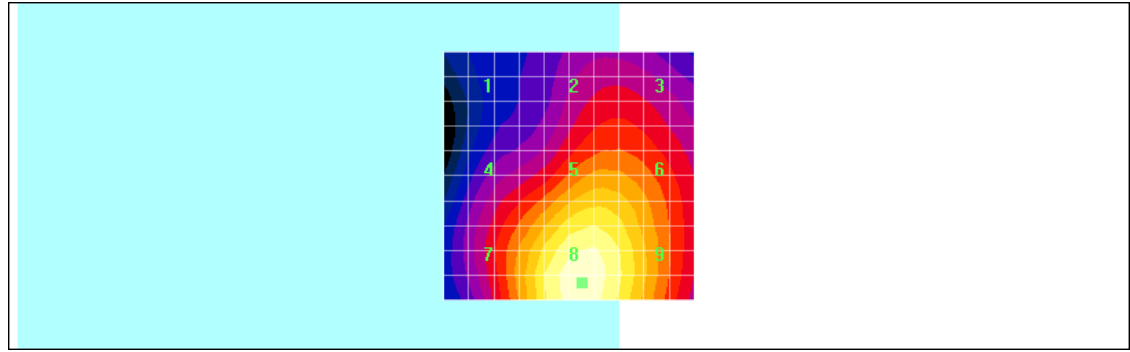
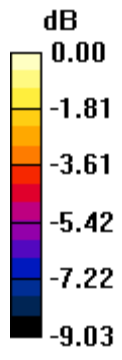
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3
0.037	0.048	0.048
Grid 4	Grid 5	Grid 6
0.050	0.064	0.063
Grid 7	Grid 8	Grid 9
0.058	0.076	0.070

Grid 1	Grid 2	Grid 3
0.094	0.121	0.122
Grid 4	Grid 5	Grid 6
0.127	0.161	0.158
Grid 7	Grid 8	Grid 9
0.145	0.191	0.176

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.076A/m

Date/Time: 23/06/2005 5:21:13 PM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Low Channel_T-Coil_Center_H-Field

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:6.35

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface)Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 0.094 A/m

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 0.233 A/m

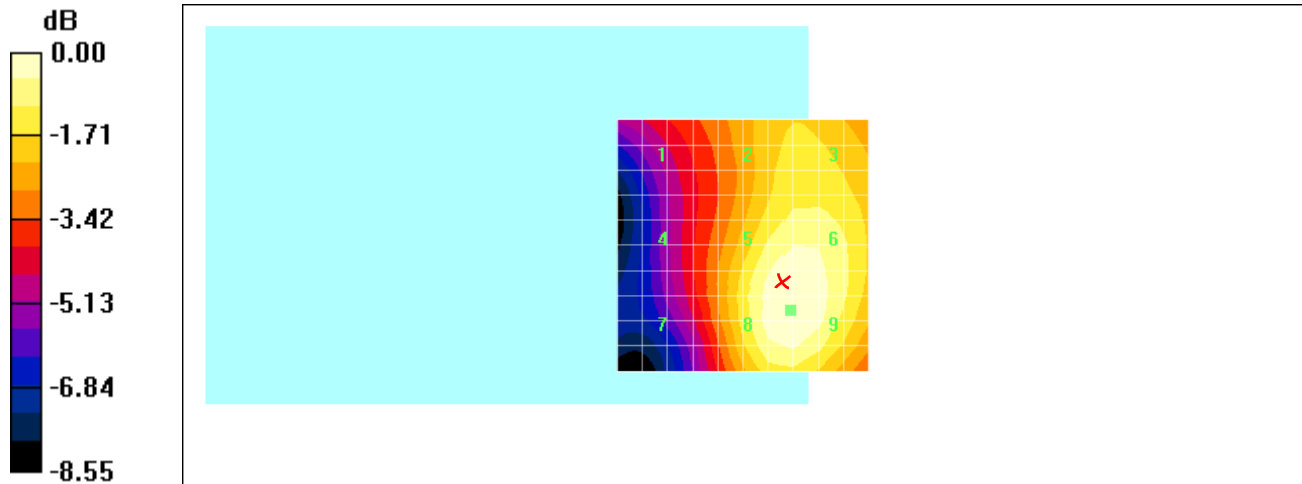
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

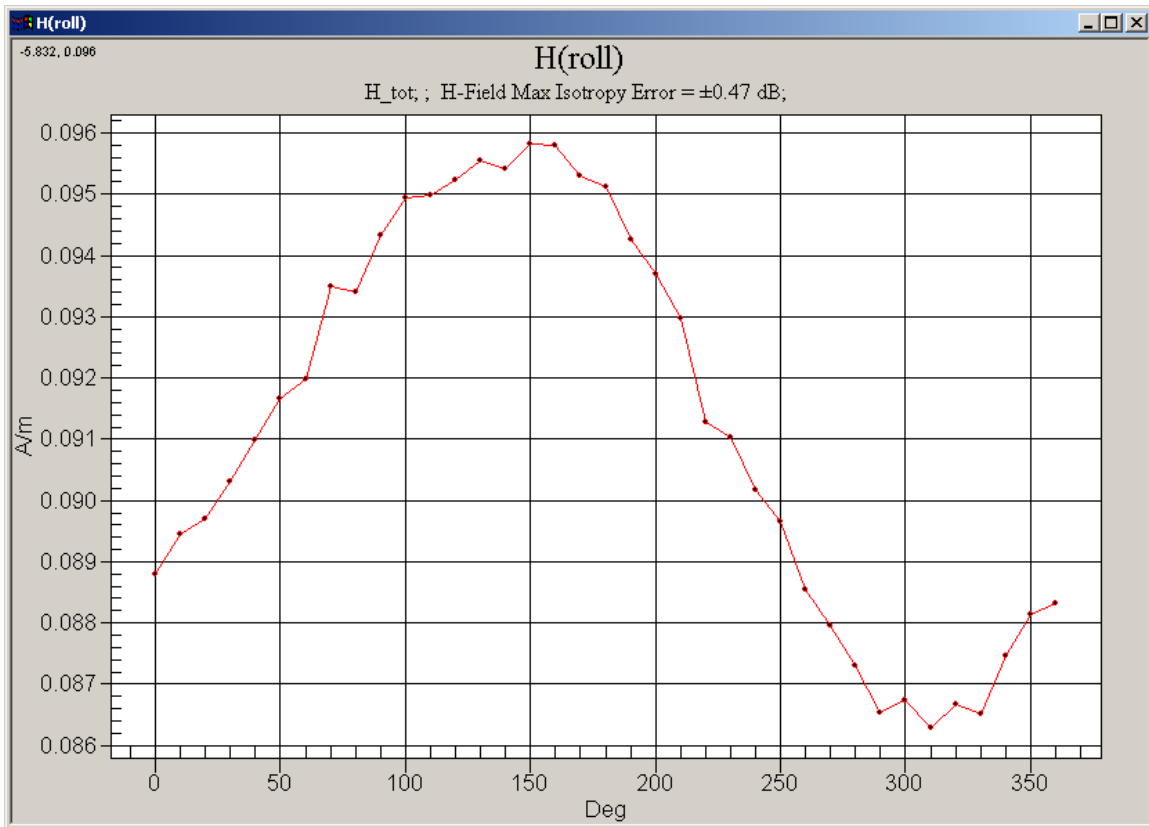
Grid 1	Grid 2	Grid 3
0.063	0.080	0.082
Grid 4	Grid 5	Grid 6
0.061	0.093	0.093
Grid 7	Grid 8	Grid 9
0.060	0.094	0.094

Grid 1	Grid 2	Grid 3
0.160	0.202	0.206
Grid 4	Grid 5	Grid 6
0.153	0.233	0.235
Grid 7	Grid 8	Grid 9
0.152	0.237	0.238

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.094A/m



Peak after Rotation = Hroll_max x PMF
 = 0.096 x 2.522
 = 0.242V/m

Power Drift for worst-case H-field scan

Locked Setup

Item	Status
Server	
DAE3 Sn472	
H3DV6 - SN6105	Not installed
Bigfoot RX90L	Lefty-Above-NoFlip
HAC Test Arch...	Not installed
Air	Not installed
BlackBerry Wir...	
GSM 1900	Not installed
DASY4 (High Pr...	ANSI-C63.19 Hearing Aid Compatibility

HAC H Device

- Phantom Adjustment and Verification (GSM 1900, Channel 512 'Low', 1850.2 MHz, Crest Factor: 6.35, Mod. Freque...
 - Surface Check (HAC)
 - Verify Height 0.5mm above Center (User point 'Height Check')
 - Delay (10 s)
 - Verify Height for Scan (Section grid reference)
 - H Scan 10mm above Device Reference (GSM 1900, Channel 512 'Low', 1850.2 MHz, Crest Factor: 6.35, Mod. Freq...
 - Power Reference Measurement: 100% done, 0.07775 A/m
 - Hearing Aid Compatibility Test 100% done, Max (interp.) = 0.09433 A/m
 - Power Drift Measurement: 100% done, 0.07772 A/m, -0.00387 dB**
 - Robot Command (Interpolated maximum of 'H Scan 10mm above Device Reference/Hearing Aid Compatibility Te...
Duration (10) 100% done, 0.0968 A/m +0.2 dB

Field

Quantity	Total	X	Y	Z	Unit

Robot Terminal

```
Timeout while waiting for header 21 0.336
*** Watchdog: Communication error
srf: 0.3%
Initial message from ES received, communication starting up
*** Probe collision
Pnoble: 1
```


Date/Time: 23/06/2005 5:32:38 PM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Mid Channel_T-Coil_Center_H-Field

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:6.35

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004

- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)

- Electronics: DAE3 Sn472; Calibrated: 03/01/2005

- Phantom: HAC Test Arch; Type: SD HAC P01 BA;

- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 0.089 A/m

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 0.223 A/m

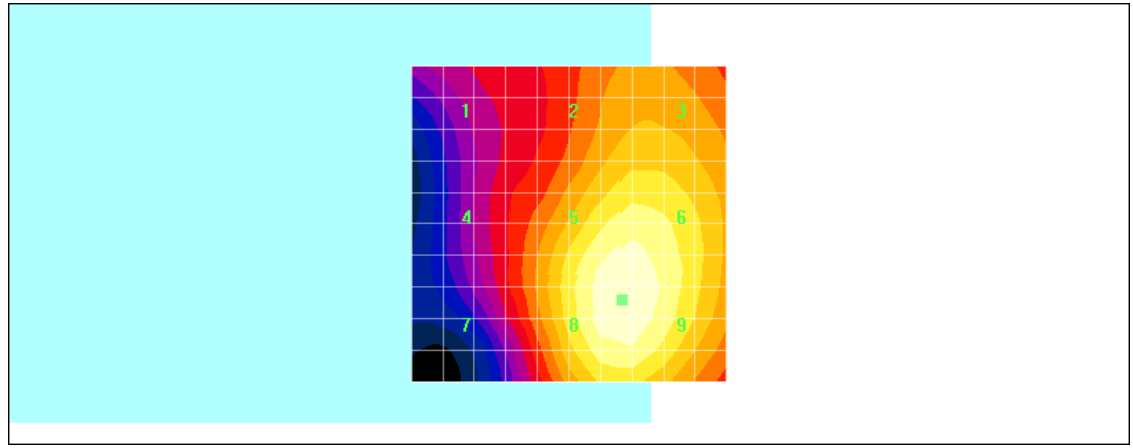
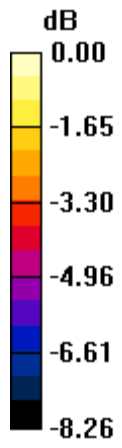
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3
0.057	0.073	0.074
Grid 4	Grid 5	Grid 6
0.059	0.088	0.089
Grid 7	Grid 8	Grid 9
0.059	0.090	0.090

Grid 1	Grid 2	Grid 3
0.143	0.183	0.188
Grid 4	Grid 5	Grid 6
0.149	0.223	0.223
Grid 7	Grid 8	Grid 9
0.149	0.226	0.226

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.090A/m

Date/Time: 23/06/2005 5:43:42 PM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_High Channel_T-Coil_Center_H-Field

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:6.35

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004

- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)

- Electronics: DAE3 Sn472; Calibrated: 03/01/2005

- Phantom: HAC Test Arch; Type: SD HAC P01 BA;

- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 0.074 A/m

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

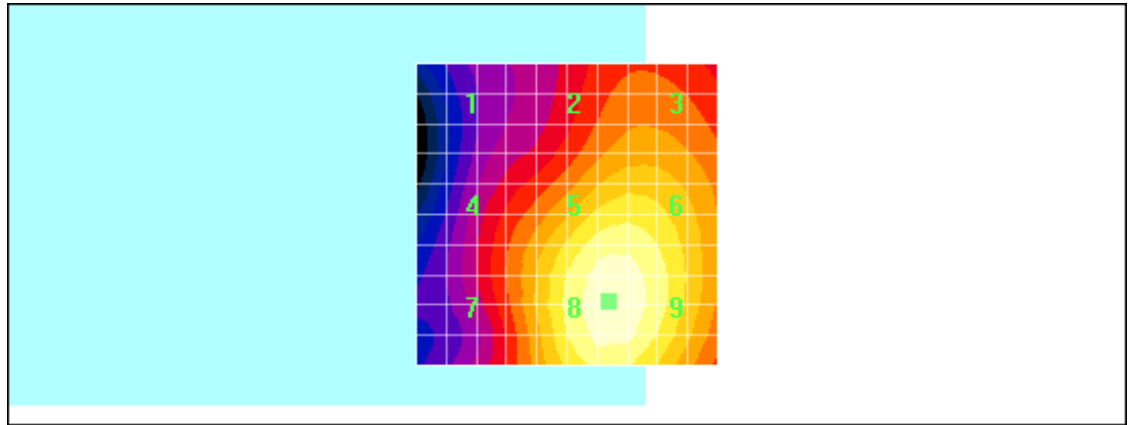
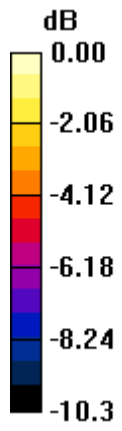
Maximum value of Total field (slot averaged) = 0.179 A/m

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.040	0.053	0.054	0.100	0.133	0.136
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.048	0.071	0.071	0.122	0.179	0.179
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.049	0.075	0.074	0.123	0.188	0.187

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.075A/m

Date/Time: 23/06/2005 6:01:20 PM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Low Channel_T-Coil_Center_H-Field_batt2

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:6.35

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface)Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 0.091 A/m

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 0.227 A/m

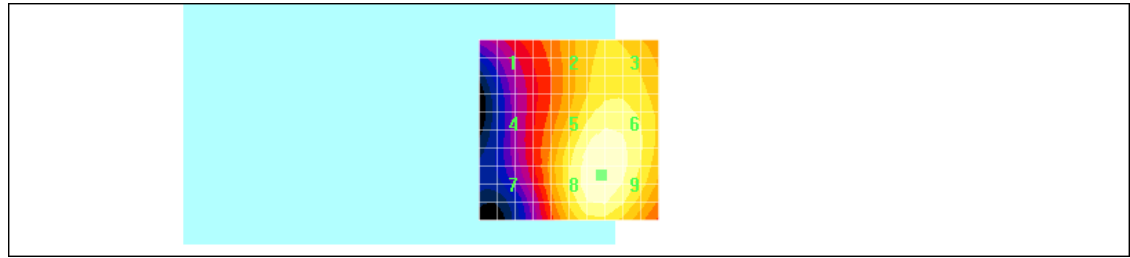
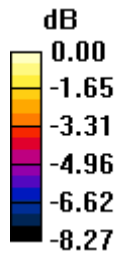
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3
0.062	0.078	0.080
Grid 4	Grid 5	Grid 6
0.060	0.090	0.091
Grid 7	Grid 8	Grid 9
0.060	0.091	0.091

Grid 1	Grid 2	Grid 3
0.156	0.197	0.202
Grid 4	Grid 5	Grid 6
0.152	0.227	0.228
Grid 7	Grid 8	Grid 9
0.151	0.230	0.230

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.091A/m

Date/Time: 23/06/2005 6:15:46 PM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Low Channel_T-Coil_Center_H-Field_batt3

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:6.35

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface)Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 0.091 A/m

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of Total field (slot averaged) = 0.227 A/m

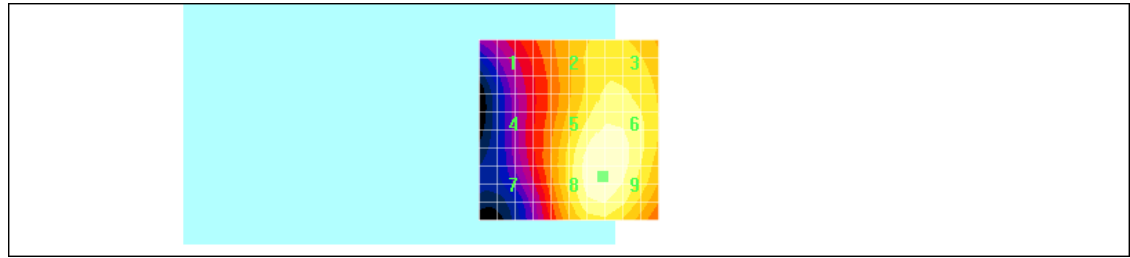
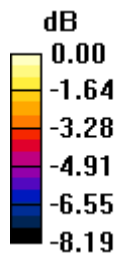
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3
0.063	0.080	0.082
Grid 4	Grid 5	Grid 6
0.060	0.090	0.091
Grid 7	Grid 8	Grid 9
0.059	0.091	0.091

Grid 1	Grid 2	Grid 3
0.158	0.202	0.206
Grid 4	Grid 5	Grid 6
0.151	0.227	0.228
Grid 7	Grid 8	Grid 9
0.150	0.229	0.229

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.091A/m

Date/Time: 23/06/2005 6:38:40 PM

Test Laboratory: RTS

BB 7290 Model RAP40GW_GSM 1900_Low Channel_T-Coil_Center_H-Field_LCD_2

DUT: BlackBerry Wireless Handheld; Type: Sample

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:6.35

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (11x11x1):

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

Maximum value of Total (measured) = 0.087 A/m

H Scan 10mm above Device Reference/Hearing Aid Compatibility Test (101x101x1):

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

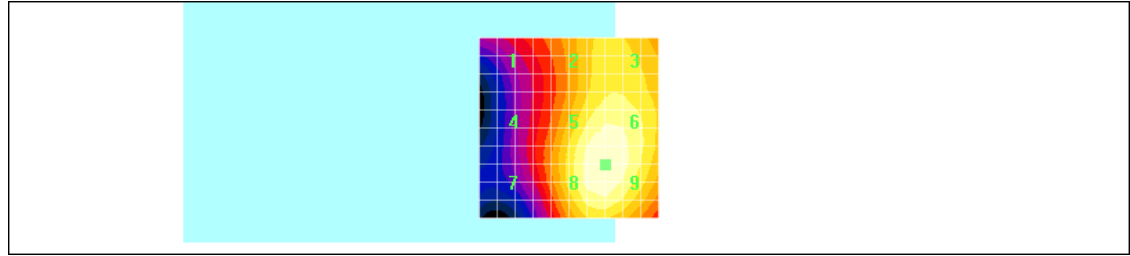
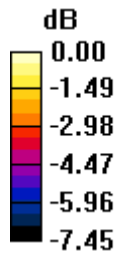
Maximum value of Total field (slot averaged) = 0.218 A/m

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1 0.061	Grid 2 0.076	Grid 3 0.078	Grid 1 0.153	Grid 2 0.192	Grid 3 0.196
Grid 4 0.059	Grid 5 0.086	Grid 6 0.087	Grid 4 0.148	Grid 5 0.218	Grid 6 0.219
Grid 7 0.059	Grid 8 0.087	Grid 9 0.087	Grid 7 0.148	Grid 8 0.219	Grid 9 0.220

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



0 dB = 0.087A/m

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

Annex B: Probe and dipole descriptions and calibration certificates

B.1 Probe and Measurement Chain Descriptions and Specifications

DASY Dosimetric Assessment System by Schmid & Partner Engineering AG



- Applications**
- Support & Downloads**
- Products**
 - DASY4 Packages
 - EASY4
 - Probes
 - ET3DV6 - Isotropic Dos-Probe
 - ES3DV3 - Isotropic Dos-Probe
 - EX3DV4 - Isotropic Dos-Probe
 - ET1DV3 - D-Probe
 - EU3V3 - Universal Vector E-Probe
 - H3DV6 - Isotropic H-Probe
 - HUV4 - Universal Vector H-Probe
 - T1V3 - Temp-Probe
 - DP1 - Dummy-Probe
 - Data Acquisition System
 - Software
 - Phantoms
 - Robots
 - Validation Kits & Calibration Dipoles
 - Hearing Aid Compatibility (HAC) Ext
 - Tissue Simulating Liquids
- SPEAG Home**

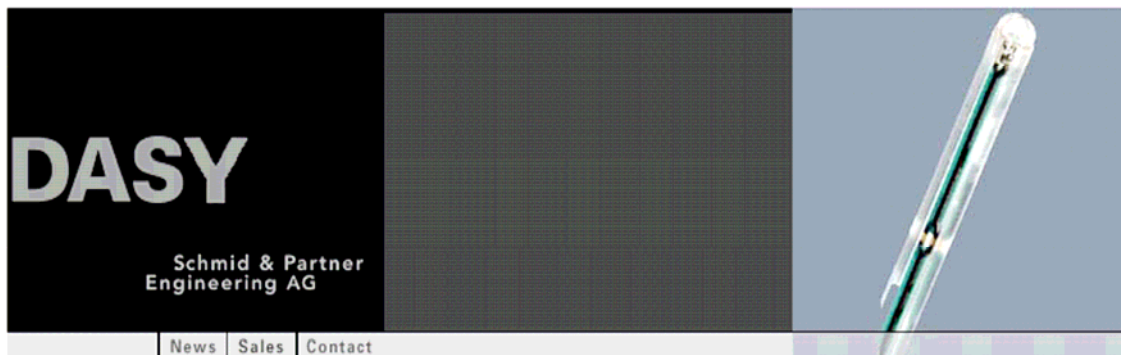
ER3DV6 ISOTROPIC E-FIELD PROBE FOR GENERAL NEAR-FIELD MEASUREMENTS

[Download Product Flyer \(PDF, 192kB\)](#)

Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycoether)
Calibration	In air from 100 MHz to 3.0 GHz (absolute accuracy $\pm 6.0\%$, $k=2$)
Frequency	100 MHz to > 6 GHz; Linearity: ± 0.2 dB (100 MHz to 3 GHz)
Directivity	± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis)
Dynamic Range	2 V/m to > 1000 V/m; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.5 mm
Application	General near-field measurements up to 6 GHz Field component measurements Fast automatic scanning in phantoms

<http://www.dasy4.com/er3.htm>

DASY Dosimetric Assessment System by Schmid & Partner Engineering AG



- Applications**
- Support & Downloads**
- Products**
 - DASY4 Packages
 - EASY4
 - Probes
 - ET3DV6 - Isotropic Dos-Probe
 - ES3DV3 - Isotropic Dos-Probe
 - EX3DV4 - Isotropic Dos-Probe
 - ET1DV3 - D-Probe
 - ER3DV6 - Isotropic E-Probe
 - EUV3 - Universal Vector E-Probe
 - HUV4 - Universal Vector H-Probe
 - T1V3 - Temp-Probe
 - DP1 - Dummy-Probe
 - Data Acquisition System
 - Software
 - Phantoms
 - Robots
 - Validation Kits & Calibration Dipoles
 - Hearing Aid Compatibility (HAC) Ext
 - Tissue Simulating Liquids
- SPEAG Home**

H3DV6 3-DIMENSIONAL H-FIELD PROBE FOR SMALL BAND APPLICATIONS

[Download Product Flyer \(PDF, 192kB\)](#)

Construction	Three concentric loop sensors with 3.8 mm loop diameters Resistively loaded detector diodes for linear response Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycoether)
Frequency	200 MHz to 3 GHz (absolute accuracy $\pm 6.0\%$, $k=2$); Output linearized
Directivity	± 0.25 dB (spherical isotropy error)
Dynamic Range	10 mA/m to 2 A/m at 1 GHz
E-Field Interference	< 10% at 3 GHz (for plane wave)
Dimensions	Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm) Distance from probe tip to dipole centers: 3 mm
Application	General magnetic near-field measurements up to 3 GHz Field component measurements Surface current measurements Measurements in air or liquids Low interaction with the measured field

<http://www.dasy4.com/h3d.htm>

All measurements were performed to the nearest element point as per the C63.19 standard. Offset distances were entered in the DASY4 software so that the measurement was to the nearest element.

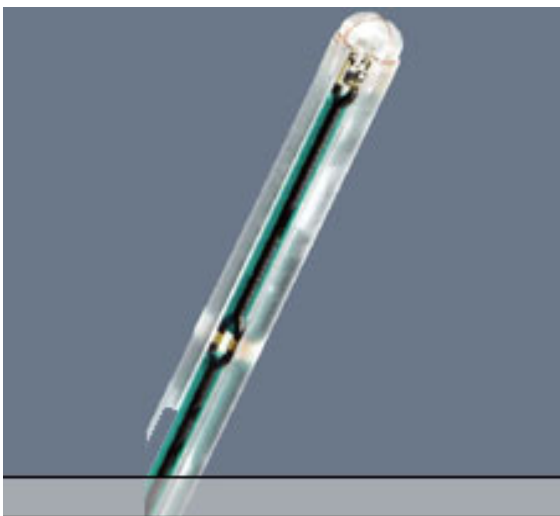
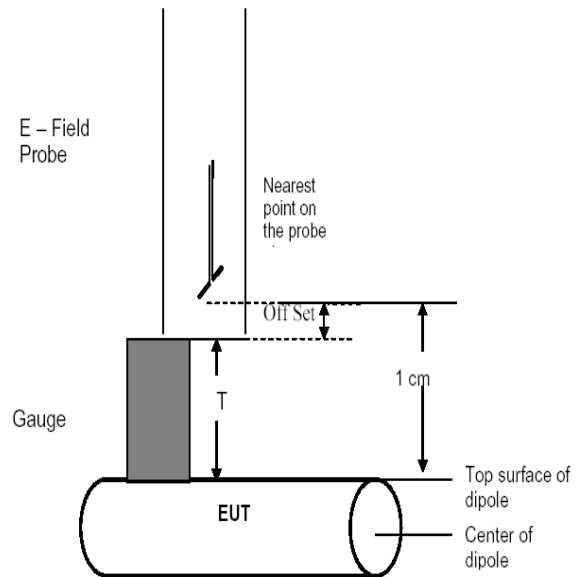
Figures 1 and 2, provided by the manufacturer, illustrate detail of the probe tip and its dimensions.

ER3DV6 E-Field probe: The distances from the probe tip to the closest points on the dipole sensors are 1.45mm for X and Y and 1.25mm for Z. From the probe tip to the center of the sensors is 2.5mm.

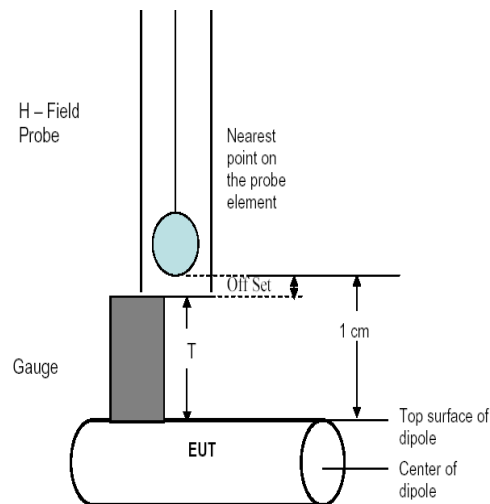
H3DV6 H-Field probe: The distance from the probe tip to the closest point of the X, Y and Z loop sensors is 1.1mm. From the probe tip to the center of the sensor is 3.00mm.



E-Field Probe (ER3DV6)



H-Field Probe (H3DV6)



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	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

The following information is from the system manufacturer user manual describing the process chain:

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i} \quad (20.1)$$

with V_i = compensated signal of channel i (i = x, y, z)
 U_i = input signal of channel i (i = x, y, z)
 cf = crest factor of exciting field (DASY parameter)
 dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

$$\text{E - fieldprobes : } E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

$$\text{H - fieldprobes : } H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1}f + a_{i2}f^2}{f}$$

with V_i = compensated signal of channel i (i = x, y, z)
 $Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
 $\mu V / (V/m)^2$ for E-field Probes
 $ConvF$ = sensitivity enhancement in solution
 a_{ij} = sensor sensitivity factors for H-field probes
 f = carrier frequency [GHz]
 E_i = electric field strength of channel i in V/m
 H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2} \quad (20.2)$$

The measurement / integration time per point is > 500 ms, as per the system manufacturer:

The time response of the field probes has been assessed by exposing the probe to a well-controlled field producing signals larger than HAC E- and H-fields of class M4. The signal response time is evaluated as the time required by the system to reach 90% of the expected final value after an on/off switch of the power source with an integration time of 500 ms and a probe response time of <5 ms. In the current implementation, DASY4 waits longer than 100 ms after having reached the grid point before starting a measurement, i.e., the response time uncertainty is negligible.

If the device under test does not emit a CW signal, the integration time applied to measure the electric field at a specific point may introduce additional uncertainties due to the discretization. The tolerances for the different systems had the worst-case of 2.6%.

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06	FCC ID L6ARAP31GW

B.2 Probe and Dipole Calibration Certificates

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

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



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

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

Accreditation No.: **SCS 108**

Client **RIM**

Certificate No: **ER3-2285_Dec04**

CALIBRATION CERTIFICATE

Object **ER3DV6 - SN:2285**
 Calibration procedure(s) **QA CAL-02.v4
 Calibration procedure for E-field probes optimized for close near field
 evaluations in air**
 Calibration date: **December 10, 2004**
 Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ER3DV6	SN: 2328	6-Oct-04 (SPEAG, No. ER3-2328_Oct04)	Oct-05
DAE4	SN: 617	29-Sep-04 (SPEAG, No. DAE4-617_Sep04)	Sep-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

Calibrated by: **Nico Vetterli** Laboratory Technician *Nico Vetterli*
 Approved by: **Katja Pokovic** Technical Manager *Katja Pokovic*

Issued: December 13, 2004

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

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	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

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



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

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

Accreditation No.: **SCS 108**

Glossary:

NORM_{x,y,z} sensitivity in free space
DCP diode compression point
Polarization ϕ ϕ rotation around probe axis
Polarization ϑ ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis
Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1309-1996, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", 1996.

Methods Applied and Interpretation of Parameters:

- **NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ for XY sensors and $\vartheta = 90$ for Z sensor ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide).
- **NORM(f)_{x,y,z}** = **NORM_{x,y,z}** * *frequency_response* (see Frequency Response Chart).
- **DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency.
- **Spherical isotropy (3D deviation from isotropy)**: in a locally homogeneous field realized using an open waveguide setup.
- **Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- **Connector Angle**: The angle is assessed using the information gained by determining the **NORM_x** (no uncertainty required).

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

ER3DV6 SN:2285

December 10, 2004

Probe ER3DV6

SN:2285

Manufactured:	September 20, 2002
Last calibrated:	January 12, 2004
Recalibrated:	December 10, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

ER3DV6 SN:2285

December 10, 2004

DASY - Parameters of Probe: ER3DV6 SN:2285

Sensitivity in Free Space [$\mu\text{V}/(\text{V}/\text{m})^2$]		Diode Compression ^A	
NormX	1.24 ± 10.1 % (k=2)	DCP X	95 mV
NormY	1.41 ± 10.1 % (k=2)	DCP Y	95 mV
NormZ	1.55 ± 10.1 % (k=2)	DCP Z	98 mV

Frequency Correction

X	0.0
Y	0.0
Z	0.0

Sensor Offset (Probe Tip to Sensor Center)

X	2.5 mm
Y	2.5 mm
Z	2.5 mm

Connector Angle 51 °

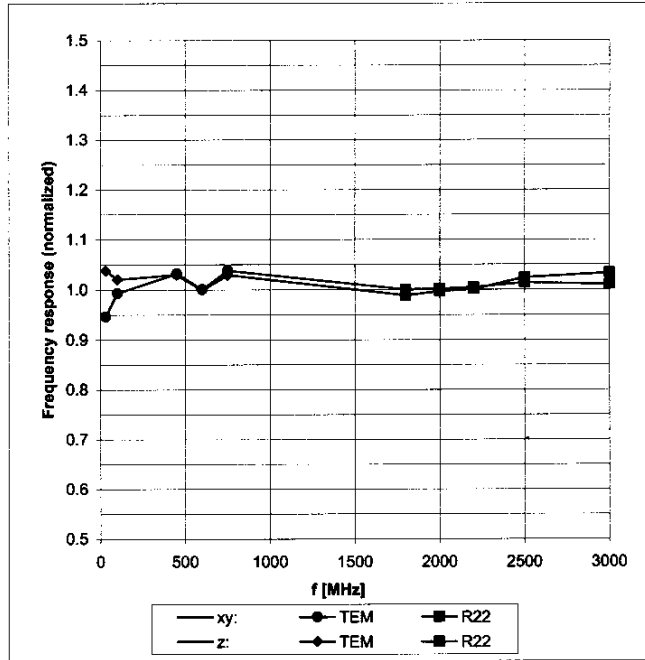
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A numerical linearization parameter: uncertainty not required

ER3DV6 SN:2285

December 10, 2004

Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide R22)

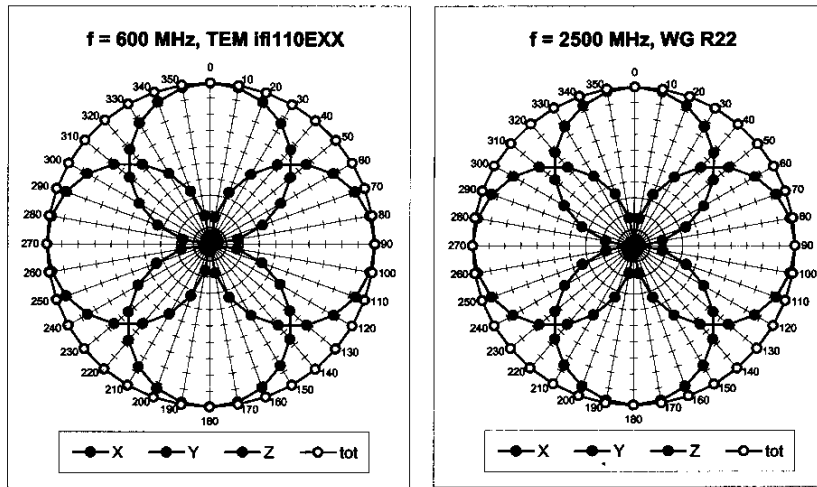


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

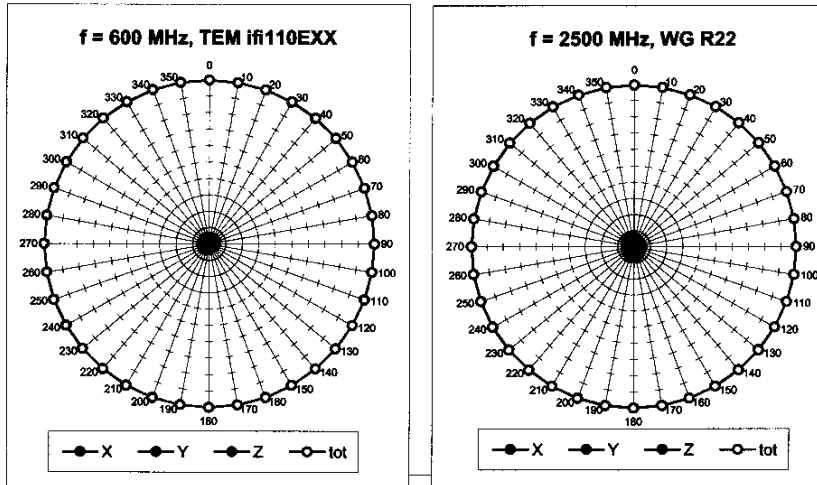
ER3DV6 SN:2285

December 10, 2004

Receiving Pattern (ϕ), $\theta = 0^\circ$



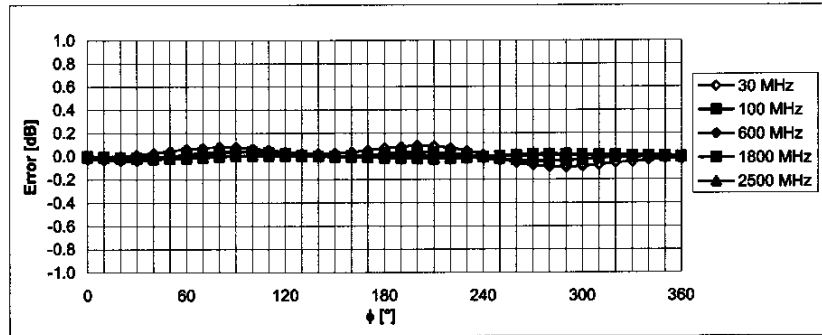
Receiving Pattern (ϕ), $\theta = 90^\circ$



ER3DV6 SN:2285

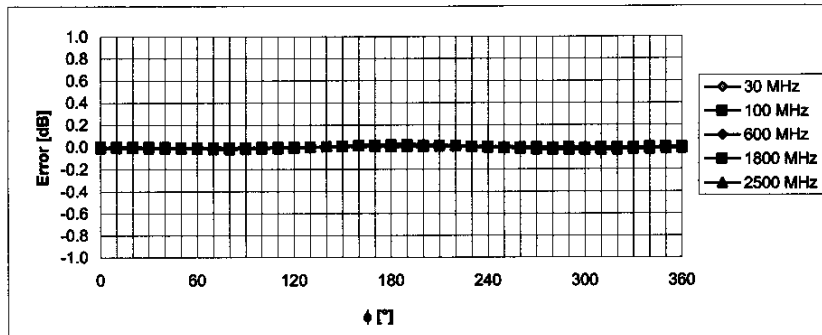
December 10, 2004

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



Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 90^\circ$

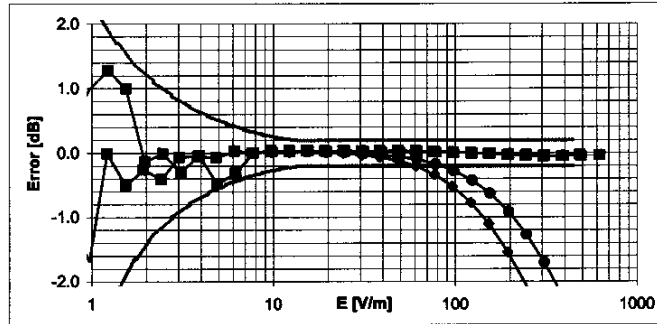
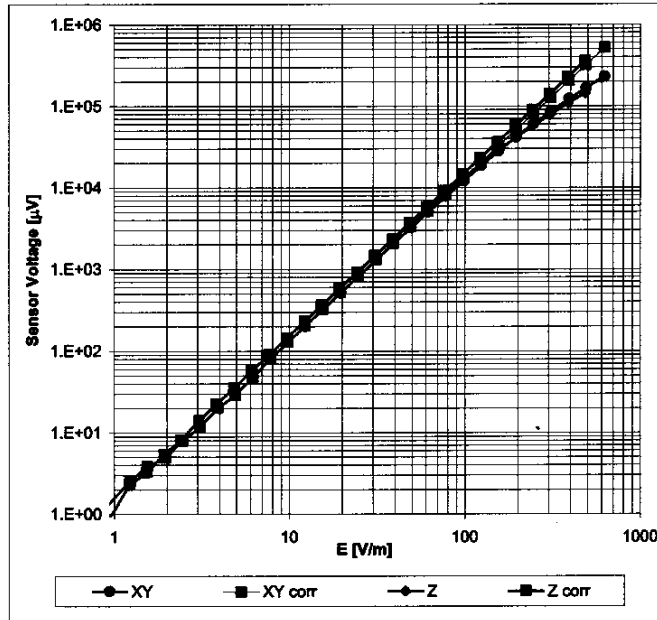


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

ER3DV6 SN:2285

December 10, 2004

Dynamic Range f(E-field)
(Waveguide R22, f = 1800 MHz)

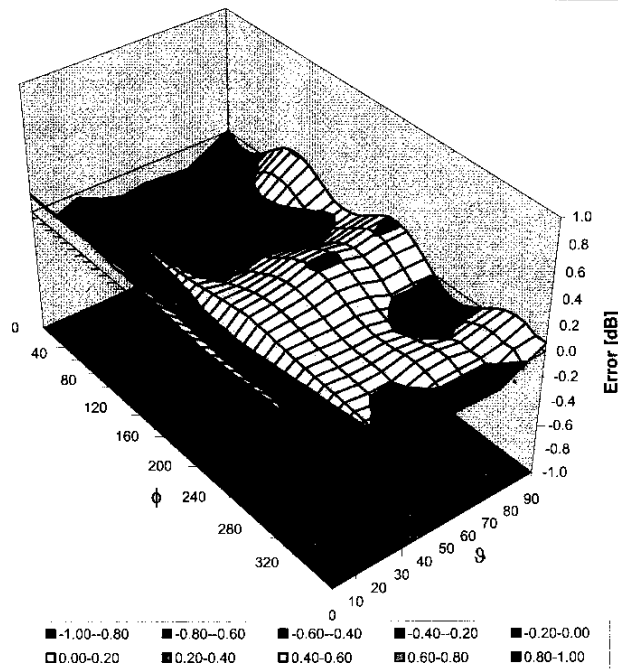


Uncertainty of Linearity Assessment: $\pm 0.6\%$ (k=2)

ER3DV6 SN:2285

December 10, 2004

Deviation from Isotropy in Air
Error (ϕ, θ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)

RTS RIM Testing Services	Document		
	Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
Author Data	Dates	Report No	FCC ID
Lauren Weber	June 22 - July 28, 2005	RTS-0248-0507-06	L6ARAP31GW

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



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C Servizio svizzero di taratura
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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

Accreditation No.: **SCS 108**

Client **RIM**

Certificate No: **H3-6105_Dec04**

CALIBRATION CERTIFICATE			
Object	H3DV6 - SN:6105		
Calibration procedure(s)	QA CAL-03.v4 Calibration procedure for H-field probes optimized for close near field evaluations in air		
Calibration date:	December 10, 2004		
Condition of the calibrated item	In Tolerance		
<p>This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p>			
Primary Standards	ID #	Cal Date (Calibrated by, Certificate No)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe H3DV6	SN: 6182	6-Oct-04 (SPEAG, No. H3-6182_Oct04)	Oct-05
DAE4	SN: 617	29-Sep-04 (SPEAG, No. DAE4-617_Sep04)	Sep-05
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05
Calibrated by:	Name Nico Vetterli	Function Laboratory Technician	Signature
Approved by:	Name Katja Poković	Function Technical Manager	Signature
			Issued: December 13, 2004
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: H3-6105_Dec04

Page 1 of 8

RTS RIM Testing Services	Document		
	Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
Author Data	Dates	Report No	FCC ID
Lauren Weber	June 22 - July 28, 2005	RTS-0248-0507-06	L6ARAP31GW

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



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S Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Glossary:

NORM_{x,y,z} sensitivity in free space
DCP diode compression point
Polarization φ φ rotation around probe axis
Polarization ϑ ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis
Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1309-1996, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", 1996.

Methods Applied and Interpretation of Parameters:

- **X, Y, Z_{a0a1a2}** : Assessed for E-field polarization $\vartheta = 90$ for XY-sensors and $\vartheta = 0$ for Z sensor ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide).
- **$X, Y, Z(f)_{a0a1a2} = X, Y, Z_{a0a1a2} * frequency_response$** (see Frequency Response Chart).
- **DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency.
- **Spherical isotropy (3D deviation from isotropy)**: in a locally homogeneous field realized using an open waveguide setup.
- **Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- **Connector Angle**: The angle is assessed using the information gained by determining the X_{a0a1a2} (no uncertainty required).

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

H3DV6 SN:6105

December 10, 2004

Probe H3DV6

SN:6105

Manufactured:	January 4, 2002
Last calibrated:	January 12, 2004
Recalibrated:	December 10, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

H3DV6 SN:6105

December 10, 2004

DASY - Parameters of Probe: H3DV6 SN:6105

Sensitivity in Free Space [A/m / $\sqrt{(\mu V)}$]

	a0	a1	a2
X	2.852E-03	1.139E-4	-2.960E-5 ± 5.1 % (k=2)
Y	2.600E-03	1.234E-4	-2.015E-5 ± 5.1 % (k=2)
Z	2.910E-03	2.506E-5	-2.259E-5 ± 5.1 % (k=2)

Diode Compression¹

DCP X	88 mV
DCP Y	88 mV
DCP Z	89 mV

Sensor Offset (Probe Tip to Sensor Center)

X	3.0 mm
Y	3.0 mm
Z	3.0 mm

Connector Angle **103 °**

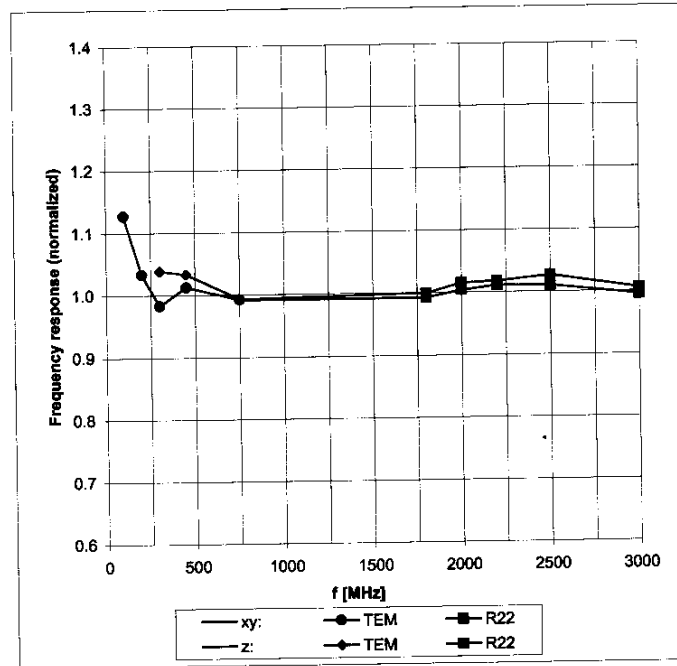
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

¹ numerical linearization parameter; uncertainty not required

H3DV6 SN:6105

December 10, 2004

Frequency Response of H-Field
(TEM-Cell:If1110, Waveguide R22)

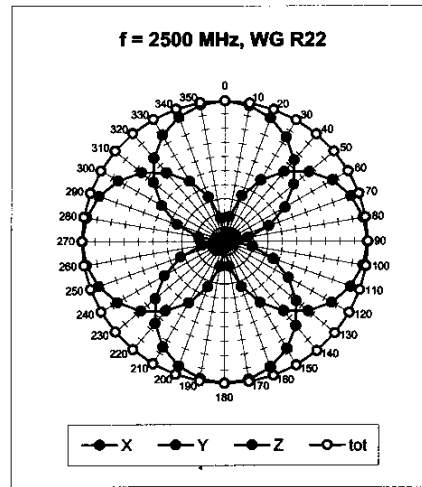
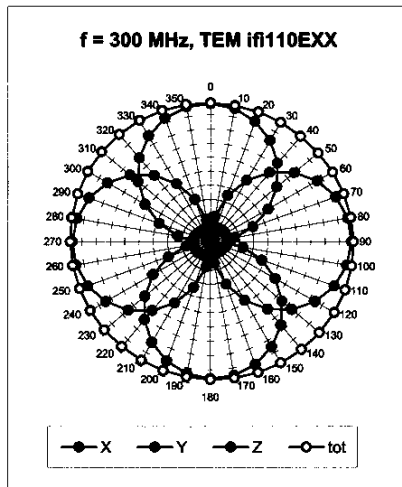


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

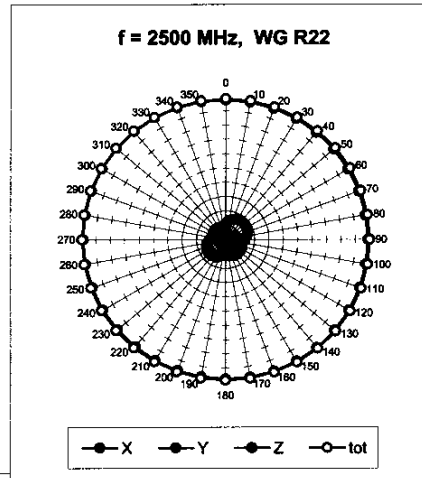
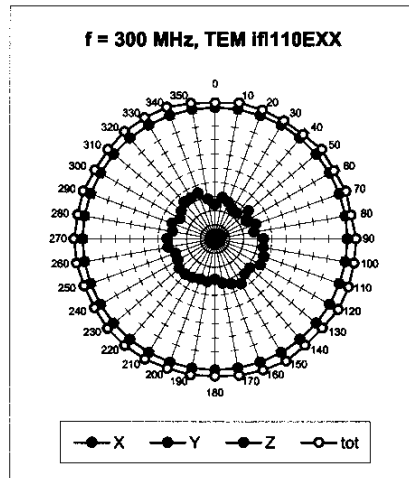
H3DV6 SN:6105

December 10, 2004

Receiving Pattern (ϕ), $\vartheta = 90^\circ$



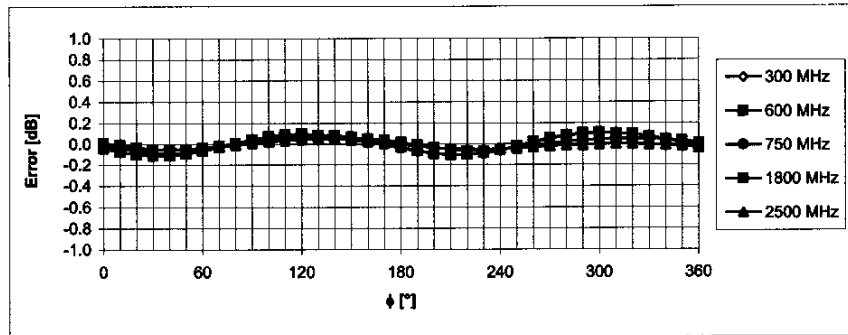
Receiving Pattern (ϕ), $\vartheta = 0^\circ$



H3DV6 SN:6105

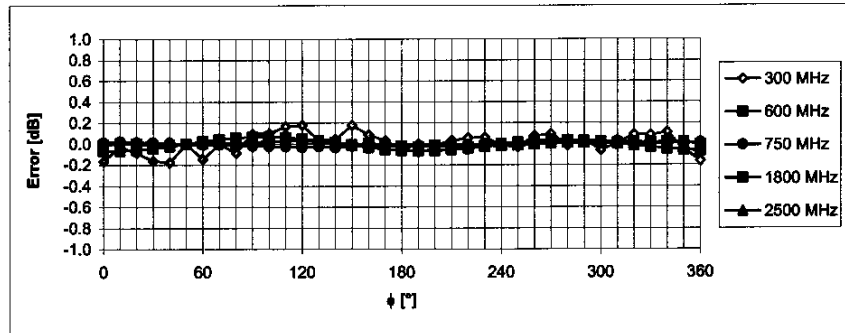
December 10, 2004

Receiving Pattern (ϕ), $\theta = 90^\circ$



Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Receiving Pattern (ϕ), $\theta = 0^\circ$

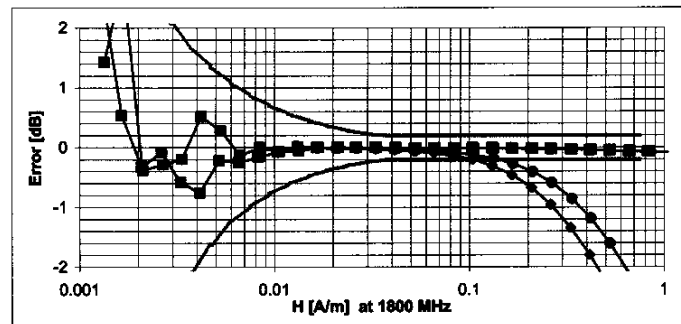
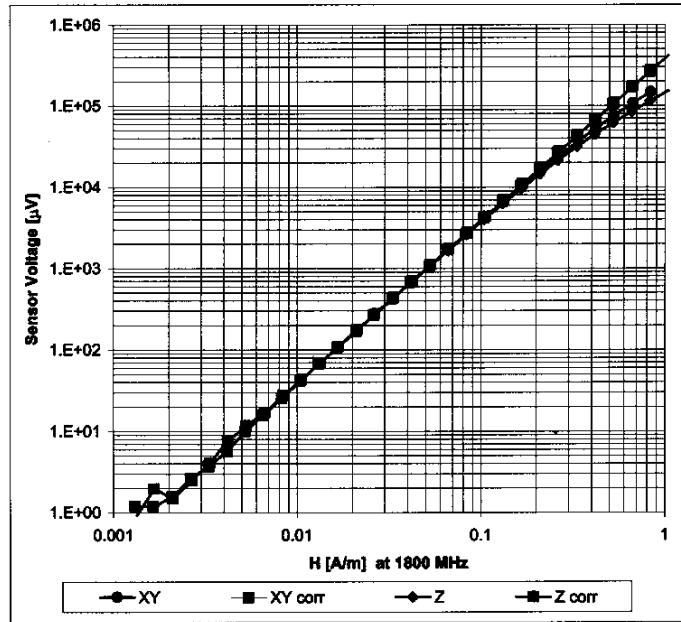


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

H3DV6 SN:6105

December 10, 2004

Dynamic Range f(H-field)
(Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

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

Client

RIM

Certificate No: **CD835V3-1011_Feb05**

CALIBRATION CERTIFICATE

Object **CD835V3 - SN: 1011**

Calibration procedure(s) **QA CAL-20.v2
Calibration procedure for dipoles in air**

Calibration date: **February, 24, 2005**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Power sensor HP 8481A	US37292783	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference Probe ER3DV6	SN 2328	06-Oct-04 (SPEAG, No. ER3-2328_Oct04)	Oct-05
DAE4	SN 601	07-Jan-05 (SPEAG, No. DAE4-601_Jan05)	Jan-06
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092312	10-Aug-03 (SPEAG, in house check Jan-04)	In house check: Oct-05
Power sensor HP 8481A	MY41093315	10-Aug-03 (SPEAG, in house check Jan-04)	In house check: Oct-05
RF generator Agilent E8251A	US41140111	4-Aug-03 (Agilent)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov-05
Probe H3DV6	SN: 6065	10-Oct-04 (SPEAG, No. H3-6065-Oct04)	Calibration, Oct-05

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	<i>M. Meili</i>
Approved by:	Fin Bornholt	Technical Director	<i>F. Bornholt</i>

Issued: February 27, 2005

This calibration certificate is issued as an intermediate solution until the specific calibration procedure is submitted and accepted in the frame of the accreditation of the Calibration Laboratory of Schmid & Partner Engineering AG (based on ISO/IEC 17025 International Standard)

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

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

References

- [1] ANSI-PC63.19-2003 (Draft)
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

Methods Applied and Interpretation of Parameters:

- *Coordinate System:* y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with standard [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- *Measurement Conditions:* Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- *Antenna Positioning:* The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY4 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- *Feed Point Impedance and Return Loss:* These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminated by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- *E-field distribution:* E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- *H-field distribution:* H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.

RTS RIM Testing Services	Document Annexes to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry 7285 Wireless Handheld Model RAP31GW		
	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

1 Measurement Conditions

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

DASY Version	DASY4	V4.5 B13
DASY PP Version	SEMCAD	V1.8 B144
Phantom	HAC Test Arch	SD HAC P01 BA, #1002
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	area = 20 x 180 mm
Frequency	835 MHz ± 1 MHz	
Forward power at dipole connector	20.0 dBm = 100mW	
Input power drift	< 0.05 dB	

2 Maximum Field values

H-field 10 mm above dipole surface	condition	interpolated maximum
Maximum measured	100 mW forward power	0.442 A/m

Uncertainty for H-field measurement: 8.2% (k=2)

E-field 10 mm above dipole surface	condition	interpolated maximum
Maximum measured above high end	100 mW forward power	165.0 V/m
Maximum measured above low end	100 mW forward power	155.8 V/m
Averaged maximum above arm	100 mW forward power	160.4 V/m

Uncertainty for E-field measurement: 12.8% (k=2)

3 Appendix

3.1 Antenna Parameters

Frequency	Return Loss	Impedance
800 MHz	16.9 dB	(40.9-j9.4) Ohm
835 MHz	27.7 dB	(52.6 + j3.3) Ohm
900 MHz	16.9 dB	(49.1 - j14.3) Ohm
950 MHz	19.9 dB	(46.5 + j8.1) Ohm
960 MHz	16.4 dB	(56.0 + j15.0) Ohm

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

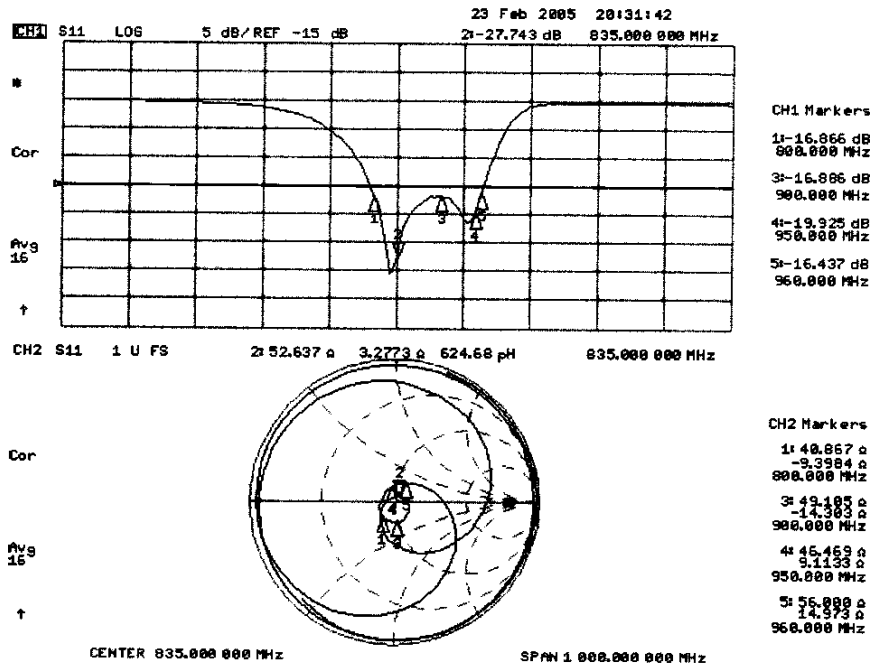
The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

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

3.3 Measurement Sheets

3.3.1 Return Loss and Smith Chart



3.3.2 DASY4 H-field result

See page 5

3.3.3 DASY4 E-Field result

See page 6

Author Data
Lauren Weber

Dates
June 22 - July 28, 2005

Report No
RTS-0248-0507-06

FCC ID
L6ARAP31GW

Date/Time: 24.02.2005 11:14:35

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: H_CD835_1011_050224.da4

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011
Program Name: HAC H Dipole

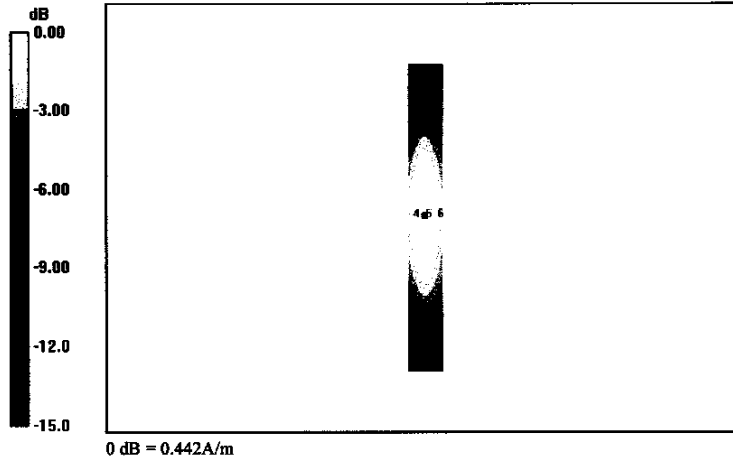
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0$; mho/m, $\epsilon_r = 1$; $\rho = 1 \text{ kg/m}^3$
Phantom section: H Dipole Section

DASY4 Configuration:
- Probe: H3DV6 - SN6065; ; Calibrated: 10.12.2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn901; Calibrated: 29.06.2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.5 Build 13; Postprocessing SW: SEMCAD, V1.8 Build 144

H Scan 10mm above CD 835 MHz/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm, dz=5.555mm
Maximum value of Total field (slot averaged) = 0.442 A/m
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.366	0.388	0.362	0.366	0.388	0.362
Grid 4		Grid 6	Grid 4		Grid 6
0.417		0.415	0.417		0.415
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.361	0.383	0.362	0.361	0.383	0.362



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	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

Date/Time: 24.02.2005 08:58:55

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: E_CD835_1011_050224.da4

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011
Program Name: HAC E Dipole

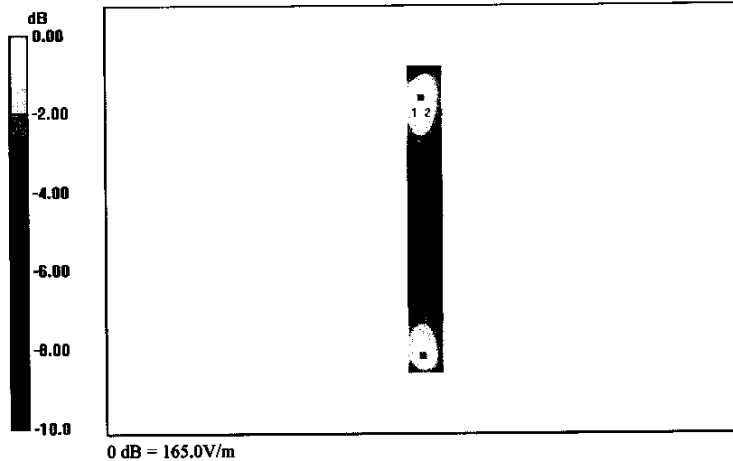
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0$; mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Dipole Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2328; ConvF(1, 1, 1); Calibrated: 06.10.2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn901; Calibrated: 29.06.2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.5 Build 13; Postprocessing SW: SEMCAD, V1.8 Build 144

E Scan 10mm above CD 835 MHz/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm, dz=5.555mm
Maximum value of Total field (slot averaged) = 165.0 V/m
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
163.5	165.0	153.0	163.5	165.0	153.0
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
90.3	91.3	85.1	90.3	91.3	85.1
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
153.1	155.8	147.3	153.1	155.8	147.3



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	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

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

Client: **RIM** Contract No: **CD1880V3-1008_Feb05**

CALIBRATION CERTIFICATE			
Object	CD1880V3 - SN: 1008		
Calibration procedure(s)	QA CAL-20.v2 Calibration procedure for dipples in air		
Calibration date:	February, 23, 2005		
Condition of the calibrated item	In Tolerance		
This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.			
Calibration Equipment used (M&TE critical for calibration)			
Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Power sensor HP 8481A	US37292783	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference Probe ER3DV6	SN 2328	06-Oct-04 (SPEAG, No. ER3-2328_Oct04)	Oct-05
DAE4	SN 601	07-Jan-05 (SPEAG, No. DAE4-601_Jan05)	Jan-06
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092312	10-Aug-03 (SPEAG, in house check Jan-04)	In house check: Oct-05
Power sensor HP 8481A	MY41093315	10-Aug-03 (SPEAG, in house check Jan-04)	In house check: Oct-05
RF generator Agilent E8251A	US41140111	4-Aug-03 (Agilent)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-04)	in house check: Nov-05
Probe H3DV6	SN: 6065	10-Oct-04 (SPEAG, No. H3-6065-Oct04)	Calibration, Oct-05
Calibrated by:	Name Mike Meil	Function Laboratory Technician	Signature <i>Mike Meil</i>
Approved by:	Name Fin Bonholt	Technical Director Technical Director	<i>Fin Bonholt</i>
Issued: February 27, 2005			
This calibration certificate is issued as an intermediate solution until the specific calibration procedure is submitted and accepted in the frame of the accreditation of the Calibration Laboratory of Schmid & Partner Engineering AG (based on ISO/IEC 17025 International Standard)			

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	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

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

References

- [1] ANSI-PC63.19-2003 (Draft)
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

Methods Applied and Interpretation of Parameters:

- Coordinate System:** y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with standard [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- Measurement Conditions:** Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- Antenna Positioning:** The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY4 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- Feed Point Impedance and Return Loss:** These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminated by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- E-field distribution:** E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- H-field distribution:** H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.

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1 Measurement Conditions

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

DASY Version	DASY4	V4.5 B13
DASY PP Version	SEMCAD	V1.8 B144
Phantom	HAC Test Arch	SD HAC P01 BA, #1002
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	area = 20 x 90 mm
Frequency	1880 MHz ± 1 MHz	
Forward power at dipole connector	20.0 dBm = 100mW	
Input power drift	< 0.05 dB	

2 Maximum Field values

H-field 10 mm above dipole surface	condition	interpolated maximum
Maximum measured	100 mW forward power	0.444 A/m

Uncertainty for H-field measurement: 8.2% (k=2)

E-field 10 mm above dipole surface	condition	interpolated maximum
Maximum measured above high end	100 mW forward power	136.1 V/m
Maximum measured above low end	100 mW forward power	134.7 V/m
Averaged maximum above arm	100 mW forward power	135.4 V/m

Uncertainty for E-field measurement: 12.8% (k=2)

3 Appendix

3.1 Antenna Parameters

Frequency	Return Loss	Impedance
1710 MHz	28.5 dB	(52.3 + j4.4) Ohm
1880 MHz	19.1 dB	(59.0 + j7.4) Ohm
1900 MHz	19.8 dB	(59.8 + j2.2) Ohm
1950 MHz	26.2 dB	(55.1 - j3.5) Ohm
2000 MHz	23.0 dB	(48.8 + j8.0) Ohm

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

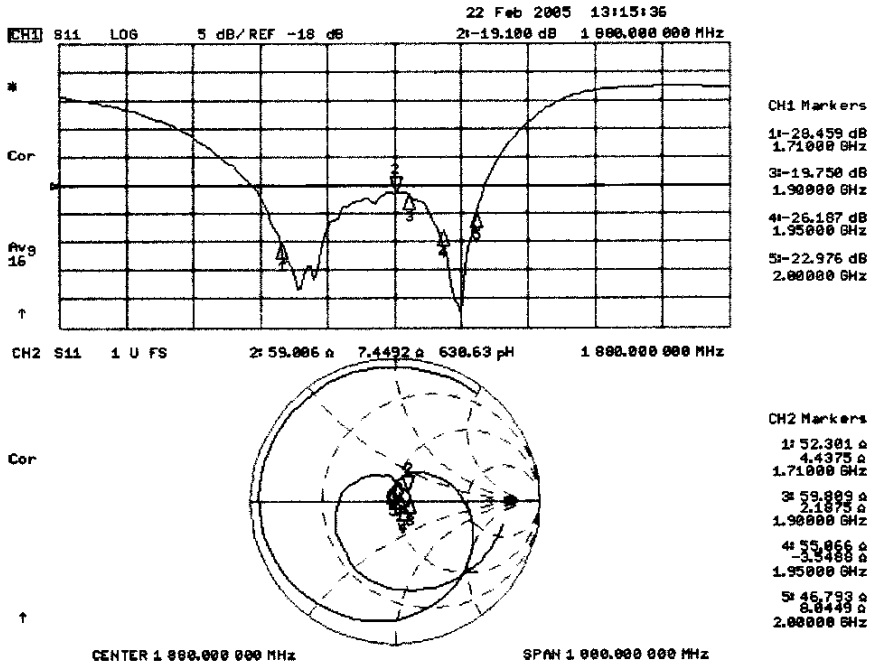
The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

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

3.3 Measurement Sheets

3.3.1 Return Loss and Smith Chart



3.3.2 DASY4 H-field result

See page 5

3.3.3 DASY4 E-Field result

See page 6

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	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

Date/Time: 23.02.2005 12:27:27

Test Laboratory: SPEAG, Zurich, Switzerland
 File Name: H_CD1880_1008_050223.da4

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1098
Program Name: HAC H Dipole

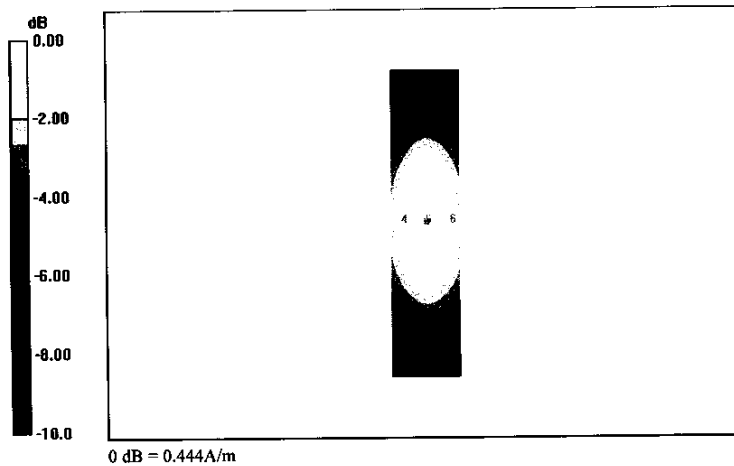
Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium parameters used: $\sigma = 0$; mho/m, $\epsilon_r = 1$; $\rho = 1 \text{ kg/m}^3$
 Phantom section: H Dipole Section

DASY4 Configuration:
 - Probe: H3DV6 - SN6065; ; Calibrated: 10.12.2004
 - Sensor-Surface: (Fix Surface)
 - Electronics: DAE4 Sn901; Calibrated: 29.06.2004
 - Phantom: HAC Phantom; Type: SD HAC P01 BA; Serial: 1002
 - Measurement SW: DASY4, V4.5 Build 13; Postprocessing SW: SEMCAD, V1.8 Build 144

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm, dz=5.5555mm
 Maximum value of Total field (slot averaged) = 0.444 A/m
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.378	0.407	0.390	0.378	0.407	0.390
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.416	0.444	0.427	0.416	0.444	0.427
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.374	0.400	0.386	0.374	0.400	0.386



Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06	FCC ID L6ARAP31GW
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Date/Time: 23.02.2005 18:29:42

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: E_CD1880_1008_050223.da4

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1008
Program Name: HAC E Dipole

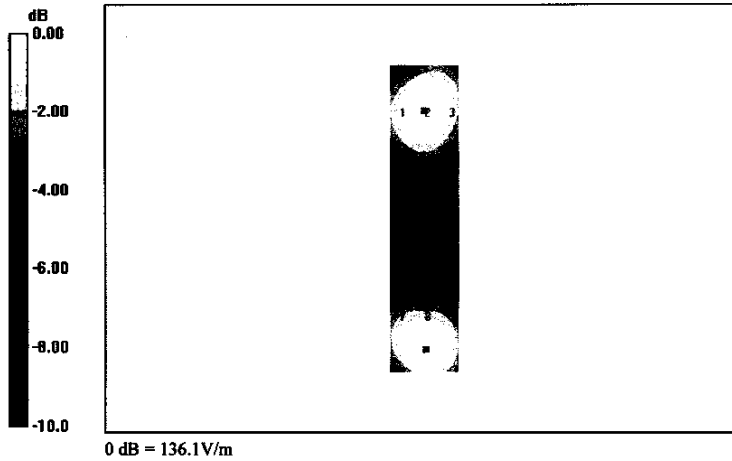
Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0$; mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Dipole Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2328; ConvF(1, 1, 1); Calibrated: 06.10.2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn901; Calibrated: 29.06.2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.5 Build 13; Postprocessing SW: SEMCAD, V1.8 Build 144

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm, dz=5.555mm
Maximum value of Total field (slot averaged) = 136.1 V/m
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1 129.7	Grid 2 134.7	Grid 3 132.4	Grid 1 129.7	Grid 2 134.7	Grid 3 132.4
Grid 4 90.0	Grid 5 92.6	Grid 6 89.2	Grid 4 90.0	Grid 5 92.6	Grid 6 89.2
Grid 7 129.1	Grid 8 136.1	Grid 9 133.9	Grid 7 129.1	Grid 8 136.1	Grid 9 133.9



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Annex C: Test set up photos

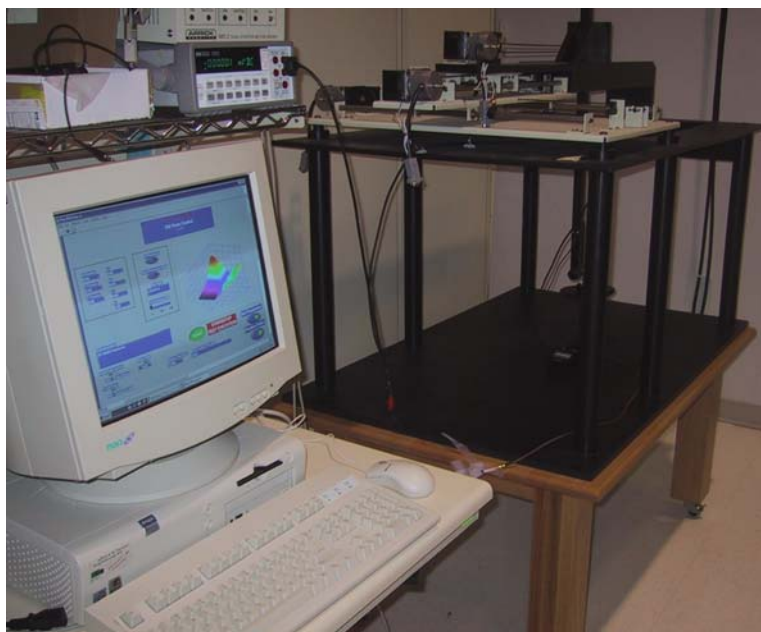


Figure C.1 – T-Coil Audio Band Magnetic Field Measurement System

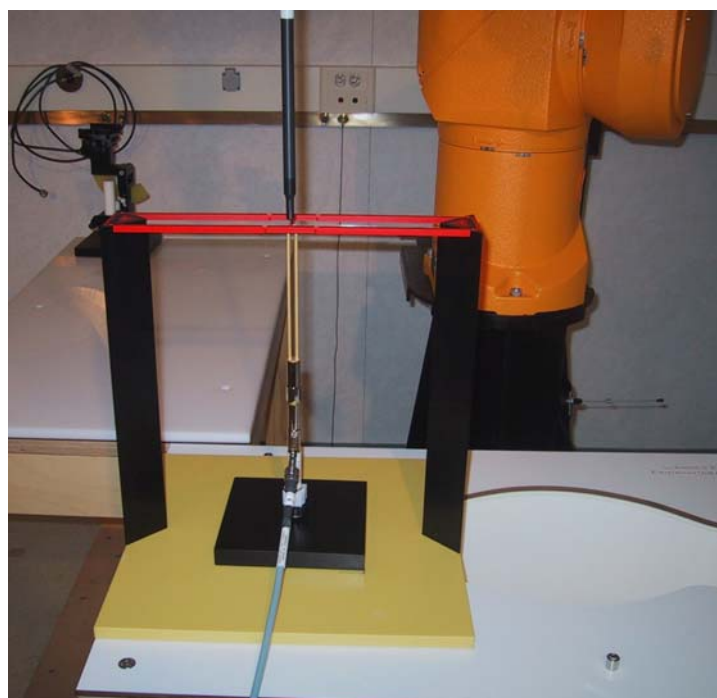


Figure C.2 – Dipole validation and modulation measurement setup

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	Author Data Lauren Weber	Dates June 22 - July 28, 2005	Report No RTS-0248-0507-06

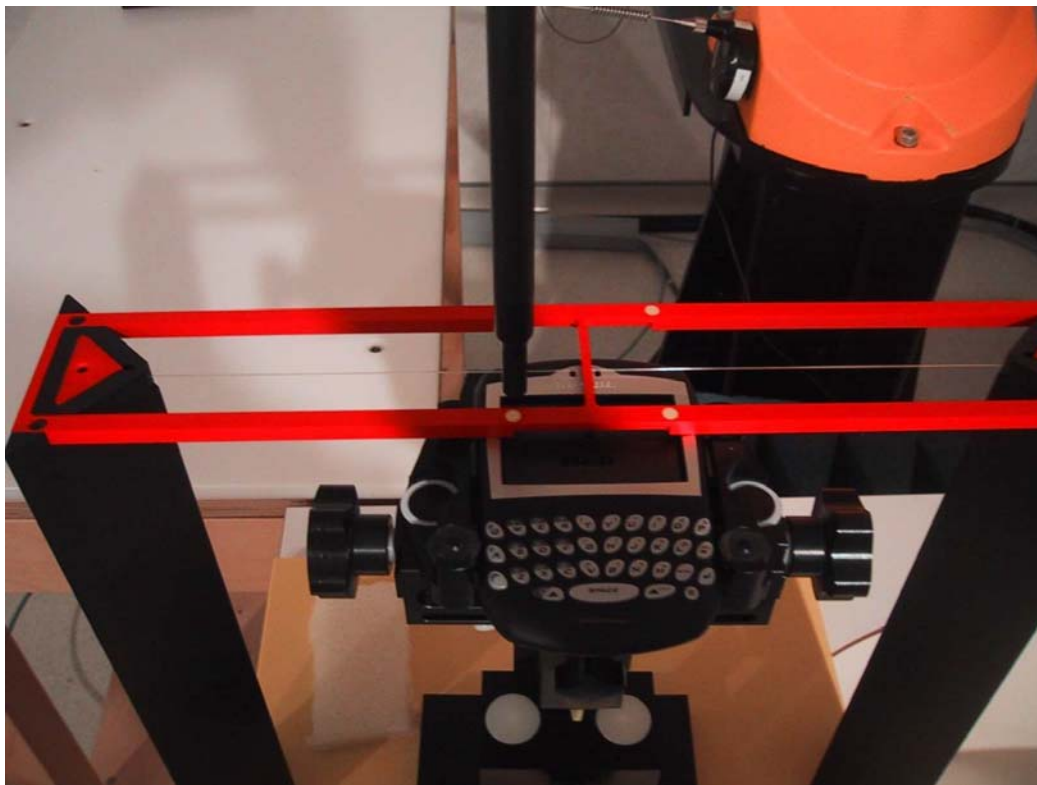


Figure C.3 – HAC RF emissions test setup