Certificate Number: 1449-02

MOTOROLA

ACCREDITED

CGISS EME Test Laboratory
8000 West Sunrise Blvd
Fort Lauderdale, FL. 33322

S.A.R. EME Compliance Test Report
Part 2 of 2

Attention:	FCC
Date of Report:	February 21, 2003
Report Revision:	Rev. O
Manufacturer:	Motorola
Product Description:	Portable 438-470 MHz 1-4W 16 Channel
FCC ID:	**ABZ99FT4056**
Device Model:	AAH50RDC9AA2AN

Test Period:	1/31/03 – 2/19/03
Test Engineer:	Stephen Whalen Sr. EME engineer
Author:	Michael Sailsman EME Regulatory Affairs

Note: Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 2.0 of this report.

Signature on File — 2/21/03

Ken Enger
Senior Resource Manager, Laboratory Director, CGISS EME Lab

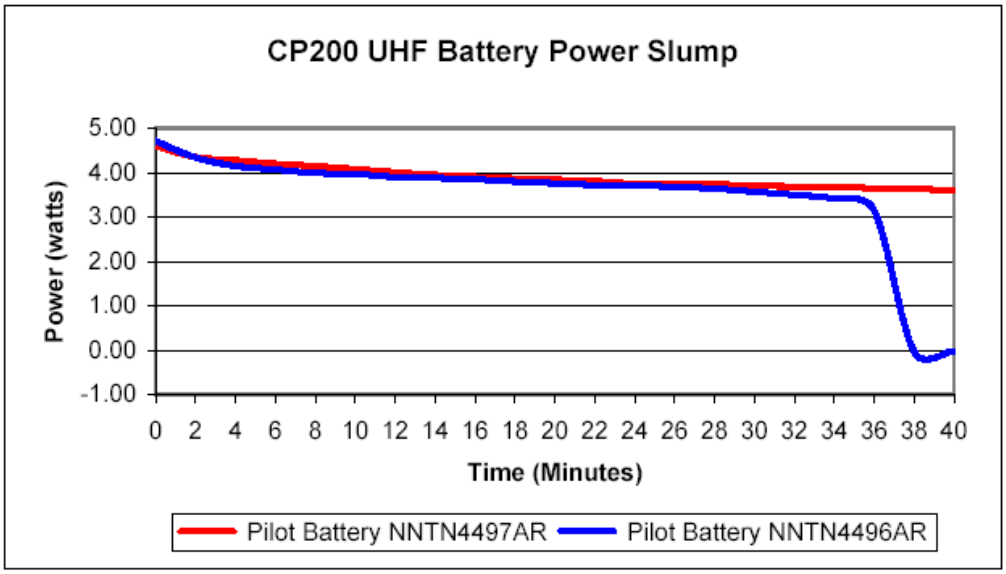
Date Approved

APPENDIX A

Power Slump Data/Shortened Scan

DUT Power versus time data

	Reading Number	Time (Minutes)	Pilot Battery NNTN4497AR	Pilot Battery NNTN4496AR
Start	1	0	4.60	4.71
	2	2	4.35	4.34
	3	4	4.28	4.15
	4	6	4.20	4.07
	5	8	4.15	3.99
	6	10	4.08	3.97
	7	12	4.01	3.90
	8	14	3.95	3.88
	9	16	3.91	3.85
	10	18	3.87	3.80
	11	20	3.84	3.76
	12	22	3.81	3.72
	13	24	3.75	3.71
	14	26	3.75	3.68
	15	28	3.74	3.64
	16	30	3.70	3.57
	17	32	3.69	3.50
	18	34	3.68	3.41
	19	36	3.65	3.14
	20	38	3.63	-0.04
Stop	21	40	3.60	-0.02



Shortened Scan Results

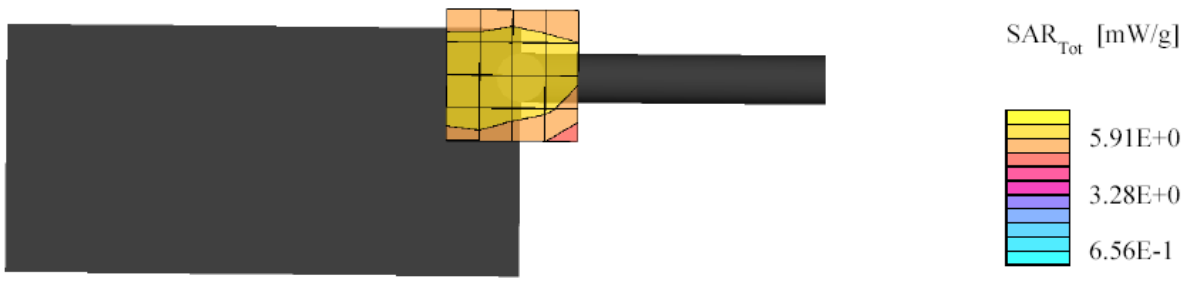
FCC ID: ABZ99FT4056; Test Date: 2/19/03
Motorola CGISS EME Laboratory
Run #: Face-R1-030219-04
Model #: AAH50RDC9AA2AN SN:018TCW0207
TX Freq: 454 MHz
Sim Tissue Temp: 21.1 (Celsius)

Antenna:NAE6522AR
Battery Kit: NNTN4496A
Carry: none Audio Acc.: none

Shortened scan reflect highest S.A.R. producing configuration at the face
Run time 7 minutes
Representative "normal" scan run time was 25 minutes
"Shortened" scan; max calc. S.A.R. (drift adjusted) w/ 50% duty cycle = 2.63 mW/g
"Normal" scan; max. calc. S.A.R. (drift adjusted) w/ 50% duty cycle = 2.55 mW/g
(see section 7.1 run # Face-030207-05)

DUT microphone at 2.5 cm separation from phantom;
Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6R SN1545 (cal date 5-21-02) - SN1545; ConvF(7.00,7.00,7.00); Probe cal date: 21/05/02; Crest factor: 1.0;
IEEE Head_454MHz: σ = 0.84 mho/m ε = 42.8 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 5x5x7: SAR (1g): 4.70 mW/g, SAR (10g): 3.44 mW/g * Max outside, (Worst-case extrapolation)

Note: "Max outside" has been identified by SPEAG as an unresolved intermittent occurrence with the DASY 3 application even when the entire peak area is captured.

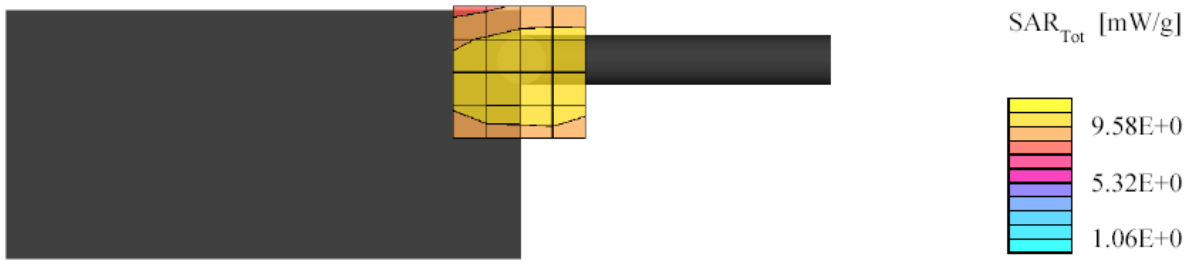


FCC ID: ABZ99FT4056; Test Date: 2/10/03
Motorola CGISS EME Laboratory
Run #: Face-030210-03
Model #: AAH50RDC9AA2AN SN:018TCW0217
TX Freq: 438 MHz
Sim Tissue Temp: 21.5 (Celsius)

- Accessories -
Antenna:NAE6522AR
Battery Kit: NNTN4497A
Carry: none
Audio Acc.: none

Shortened scan reflect highest S.A.R. producing configuration at the face
Run time 7 minutes
Representative "normal" scan run time was 24 minutes
"Shortened" scan; max calc. S.A.R. (drift adjusted) w/ 50% duty cycle = 4.03 mW/g
"Normal" scan; max. calc. S.A.R. (drift adjusted) w/ 50% duty cycle = 4.06 mW/g
(see section 7.1 run # Face-030207-06)

DUT microphone at 2.5 cm separation from phantom;
Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6R SN1545 (cal date 5-21-02) - SN1545; ConvF(7.00,7.00,7.00); Probe cal date: 21/05/02; Crest factor: 1.0;
IEEE Head_454MHz: σ = 0.89 mho/m ε = 44.0 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 5x5x7: SAR (1g): 7.59 mW/g, SAR (10g): 5.53 mW/g, (Worst-case extrapolation)

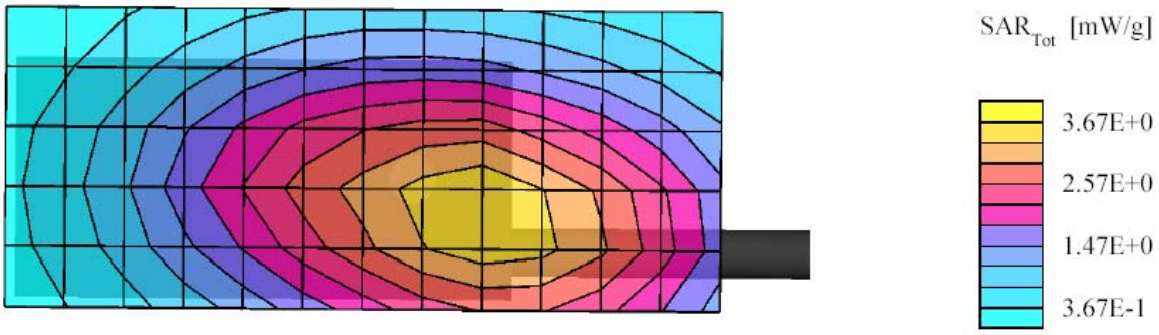


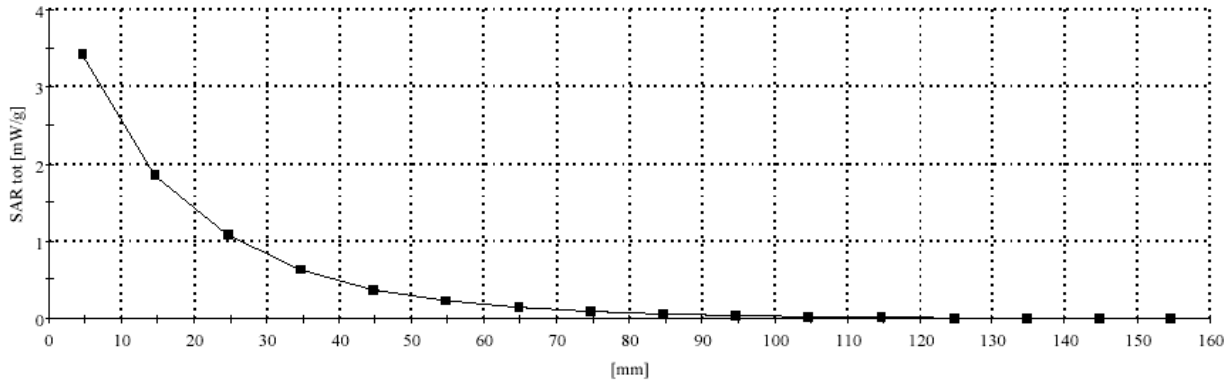
APPENDIX B
Data Results

FCC ID: ABZ99FT4056; Test Date: 01/31/03
Motorola CGISS EME Laboratory
Run #: Ab-R1-030131-06
Model #: AAH50RDC9AA2AN SN:018TCW0217
TX Freq: 454 MHz
Sim Tissue Temp: 21.5 (Celsius)

- Accessories -
Antenna:NAE6522AR
Battery Kit: NNTN4496A
Carry: belt clip HLN8255B
Audio Acc. HMN9030A RSM

DUT w/ belt clip against the flat phantom
Prototype - Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6R(cal date 5-21-02) - SN1545; ConvF(7.10,7.10,7.10); Probe cal date: 21/05/02; Crest factor: 1.0; FCC Body_454MHz: σ = 0.94 mho/m ε = 55.6 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 3.54 mW/g, SAR (10g): 2.55 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 49.5, 120.0, 4.7

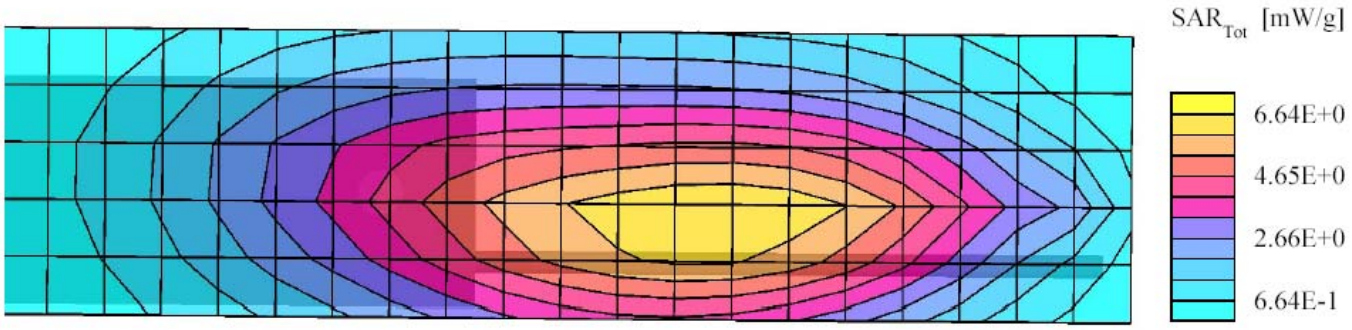


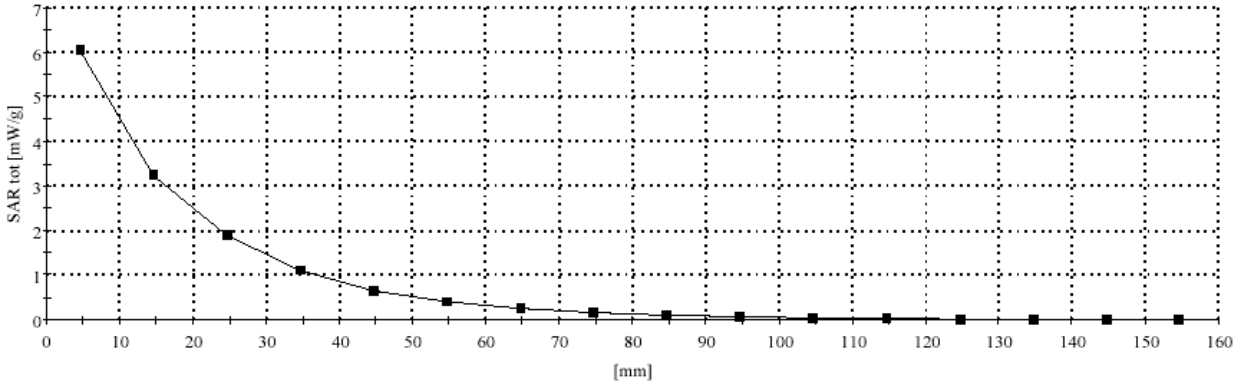


FCC ID: ABZ99FT4056; Test Date: 02/04/03
Motorola CGISS EME Laboratory
Run #: Ab-R1-030204-02
Model #: AAH50RDC9AA2AN SN:018TCW0217
TX Freq: 438 MHz
Sim Tissue Temp: 20.8 (Celsius)

- Accessories -
Antenna:NAE6483AR
Battery Kit: NNTN4496A
Carry: chest pak HLN6602A
Audio Acc. HMN9030A RSM

DUT w/ chest pak against the flat phantom
Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6R(cal date 5-21-02) - SN1545; ConvF(7.10,7.10,7.10); Probe cal date: 21/05/02; Crest factor: 1.0; FCC Body_454MHz: σ = 0.93 mho/m ε = 55.4 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 6.46 mW/g, SAR (10g): 4.64 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 49.5, 190.5, 4.7



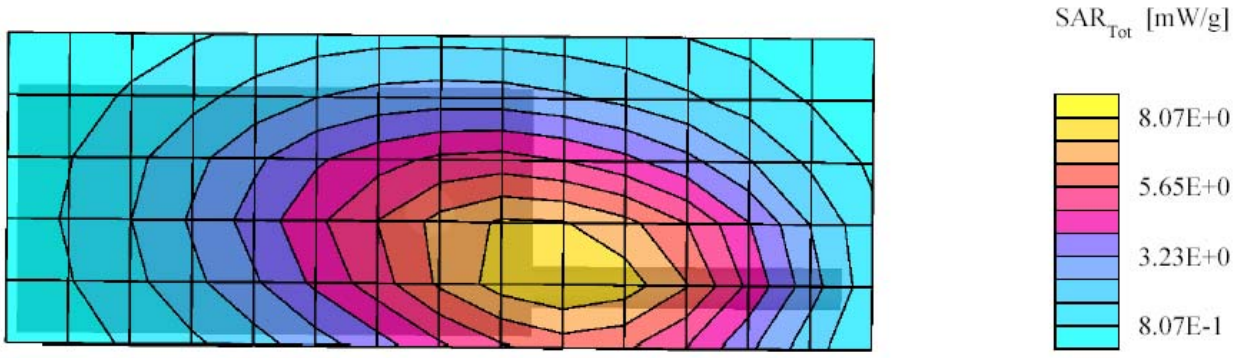


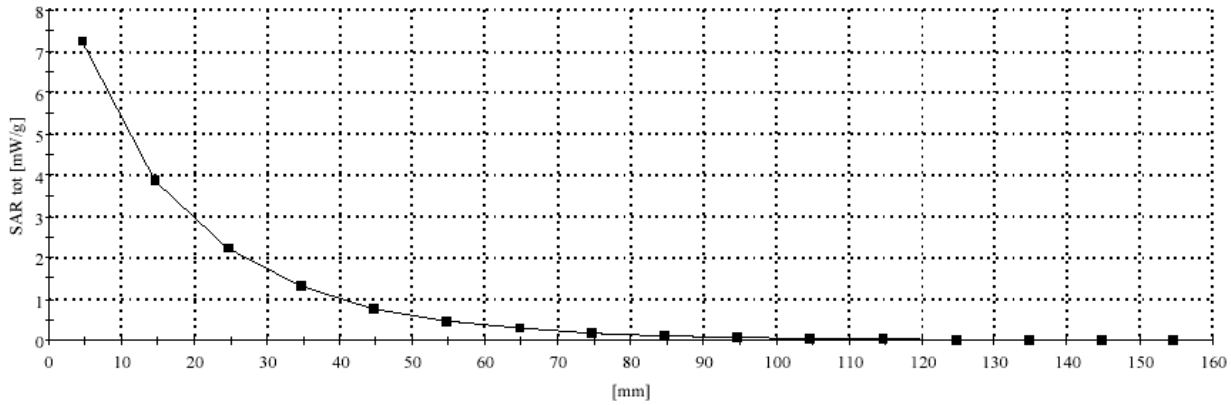
FCC ID: ABZ99FT4056; Test Date: 02/05/03
Motorola CGISS EME Laboratory
Run #: Ab-R1-030205-06
Model #: AAH50RDC9AA2AN SN:018TCW0207
TX Freq: 438 MHz
Sim Tissue Temp: 21.0 (Celsius)

Antenna: NAE6522AR
Battery Kit: NNTN4496A
Carry: chest pak HLN6602A
Audio Acc. BDN6648C headset

DUT w/ chest pack against the flat phantom
Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6R(cal date 5-21-02) - SN1545; ConvF(7.10,7.10,7.10); Probe cal date: 21/05/02; Crest factor: 1.0; FCC Body_454MHz: σ = 0.94 mho/m ε = 55.7 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 7.70 mW/g, SAR (10g): 5.52 mW/g * Max outside, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 57.0, 135.0, 4.7

Note: "Max outside" has been identified by SPEAG as an unresolved intermittent occurrence with the DASY 3 application even when the entire peak area is captured.

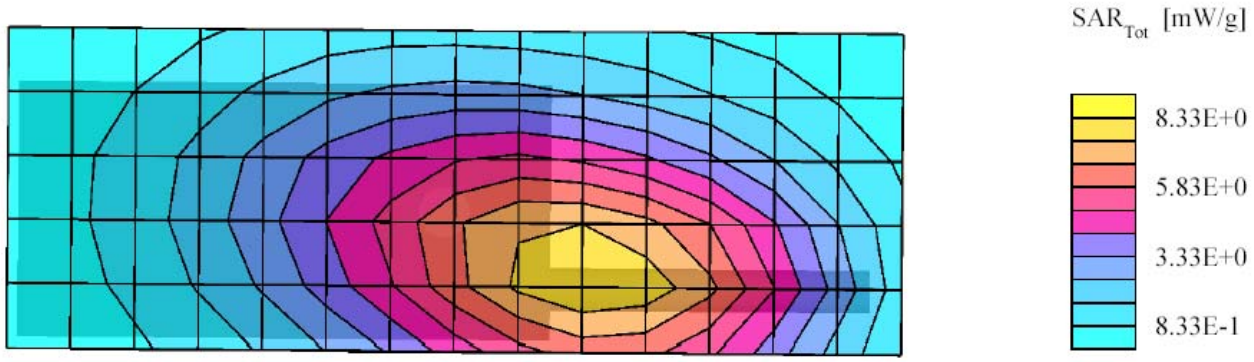


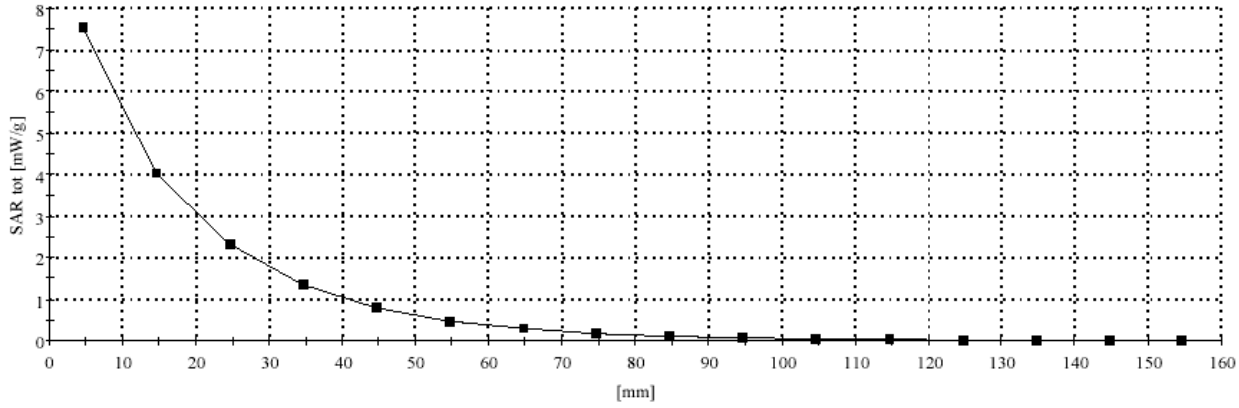


FCC ID: ABZ99FT4056; Test Date: 02/05/03
Motorola CGISS EME Laboratory
Run #: Ab-R1-030205-05
Model #: AAH50RDC9AA2AN SN:018TCW0217
TX Freq: 438 MHz
Sim Tissue Temp: 21.0 (Celsius)

Antenna:NAE6522AR
Battery Kit: NNTN4496A
Carry: chest pak HLN6602A
Audio Acc. BDN6648C headset

DUT w/ chest pack against the flat phantom
Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6R(cal date 5-21-02) - SN1545; ConvF(7.10,7.10,7.10); Probe cal date: 21/05/02; Crest factor: 1.0; FCC Body_454MHz: σ = 0.94 mho/m ε = 55.7 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 7.95 mW/g, SAR (10g): 5.69 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 57.0, 136.5, 4.7



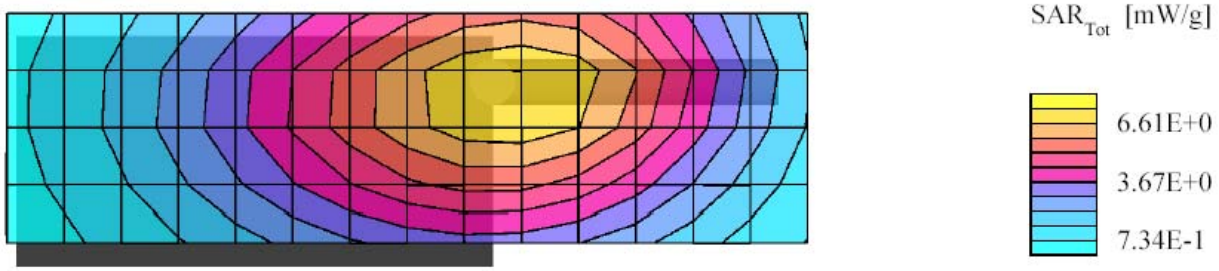


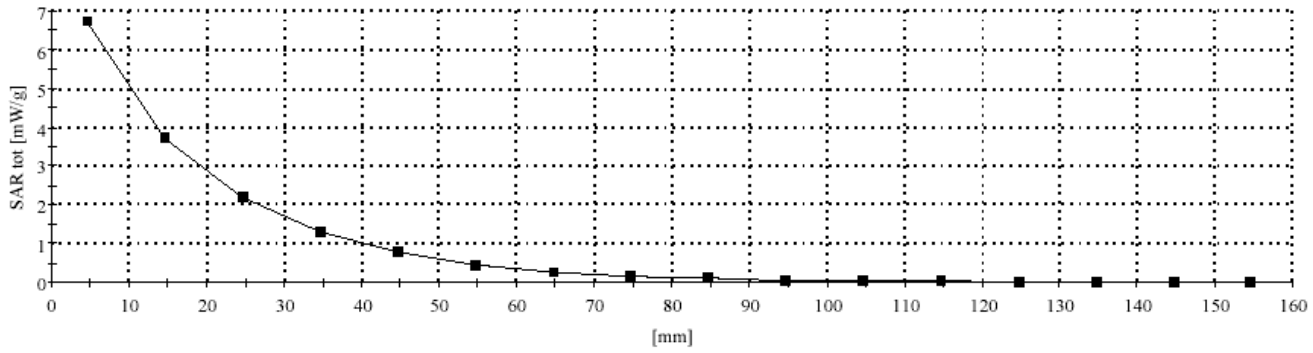
FCC ID: ABZ99FT4056; Test Date: 02/10/03
Motorola CGISS EME Laboratory
Run #: Face-R1-030210-03
Model #: AAH50RDC9AA2AN SN:018TCW0217
TX Freq: 438 MHz
Sim Tissue Temp: 21.5 (Celsius)

Antenna:NAE6522AR
Battery Kit: NNTN4497A
Carry: none
Audio Acc.: none

DUT microphone towards phantom w/ 2.5 cm separation
Flat Phantom; Position: (90°,90°);
Probe: ET3DV6R SN1545 (cal date 5-21-02) - SN1545; ConvF(7.00,7.00,7.00); Probe cal date: 21/05/02; Crest factor: 1.0;
IEEE Head_454MHz: σ = 0.89 mho/m ε = 44.0 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 6.99 mW/g, SAR (10g): 5.10 mW/g * Max outside, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 21.0, 132.0, 4.7

Note: "Max outside" has been identified by SPEAG as an unresolved intermittent occurrence with the DASY 3 application even when the entire peak area is captured.



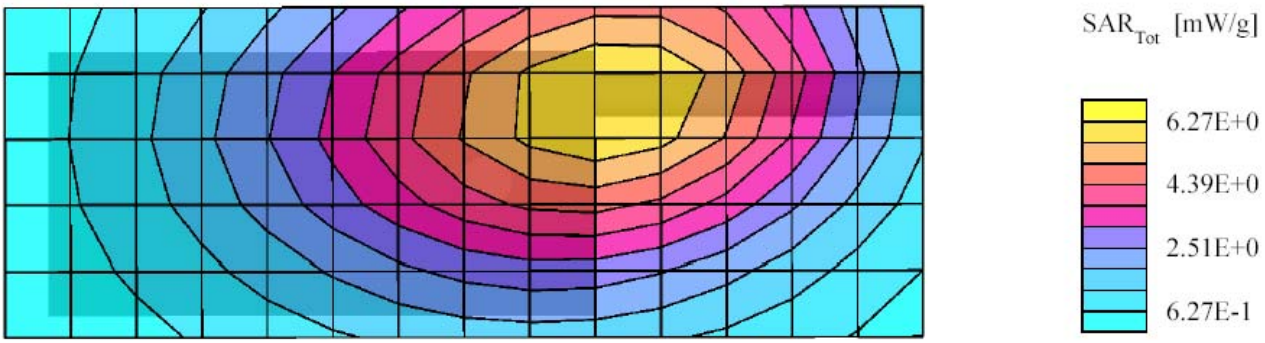


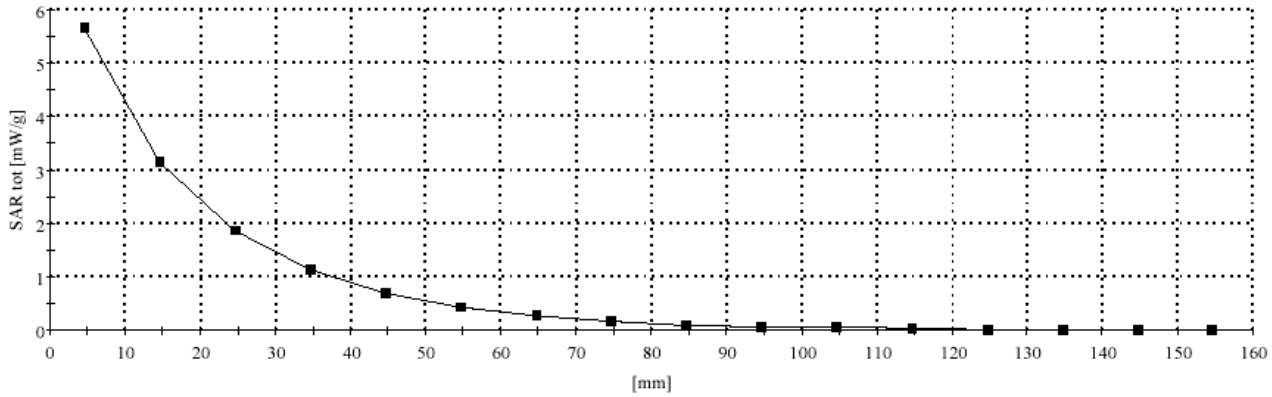
FCC ID: ABZ99FT4056; Test Date: 02/18/03
Motorola CGISS EME Laboratory
Run #: Ab-R1-030218-03
Model #: AAH50RDC9AA2AN SN:018TCW0217
TX Freq: 438 MHz
Sim Tissue Temp: 20.5 (Celsius)

Antenna: NAE6522AR
Battery Kit: NNTN4496A
Carry: none
Audio Acc. BDN6648C headset

DUT microphone towards phantom w/ 2.5 cm separation
Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6R SN1545 (cal date 5-21-02) - SN1545; ConvF(7.10,7.10,7.10); Probe cal date: 21/05/02; Crest factor: 1.0;
FCC Body_454 MHz: σ = 0.91 mho/m ε = 55.5 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 6.07 mW/g, SAR (10g): 4.44 mW/g * Max outside, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 21.0, 138.0, 4.7

Note: "Max outside" has been identified by SPEAG as an unresolved intermittent occurrence with the DASY 3 application even when the entire peak area is captured.

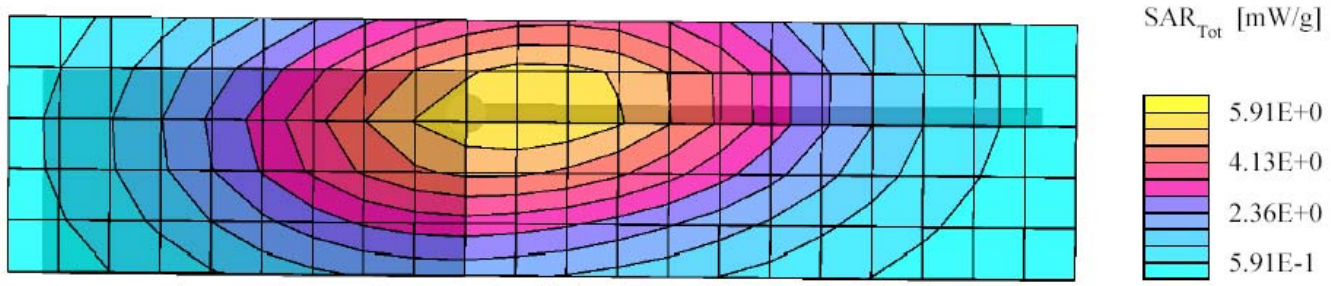


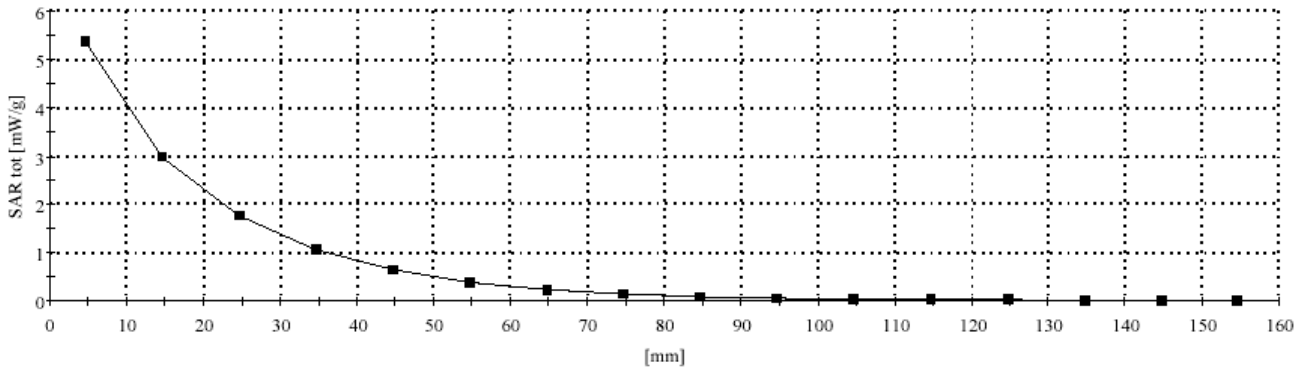


FCC ID: ABZ99FT4056; Test Date: 02/19/03
Motorola CGISS EME Laboratory
Run #: Face-R1-030219-02
Model #: AAH50RDC9AA2AN SN:018TCW0207
TX Freq: 438 MHz
Sim Tissue Temp: 21.1 (Celsius)

Antenna:NAE6483AR
Battery Kit: NNTN4497A
Carry: none
Audio Acc.: none

DUT microphone towards phantom w/ 2.5 cm separation
Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6R SN1545 (cal date 5-21-02) - SN1545; ConvF(7.00,7.00,7.00); Probe cal date: 21/05/02; Crest factor: 1.0;
IEEE Head_454MHz: σ = 0.84 mho/m ε = 42.8 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 5.56 mW/g, SAR (10g): 4.08 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 25.5, 151.5, 4.7

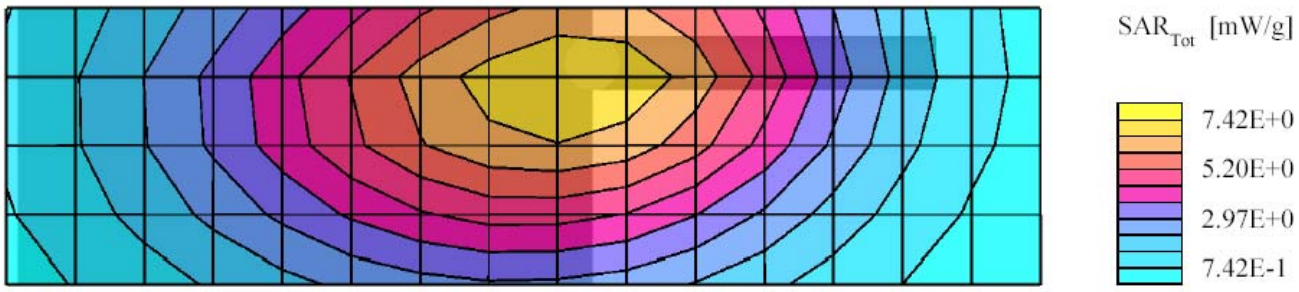


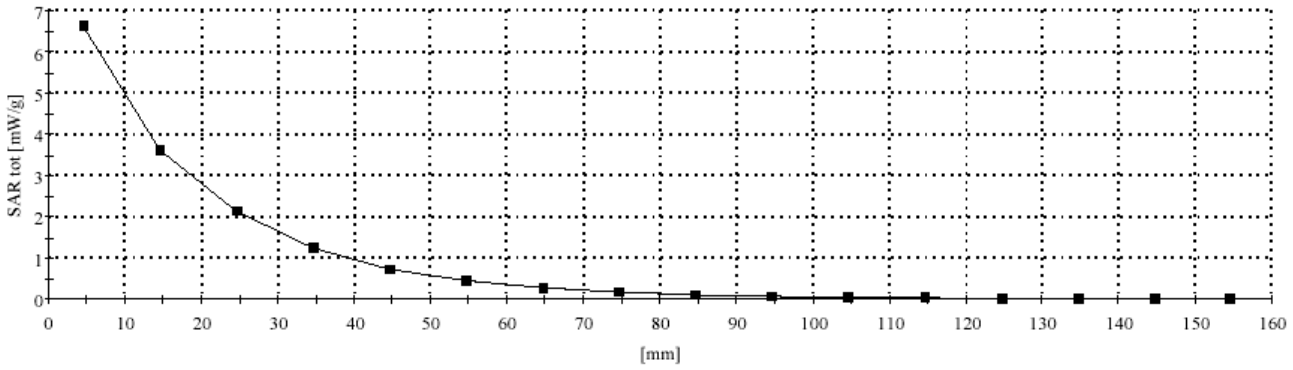


FCC ID: ABZ99FT4056; Test Date: 02/07/03
Motorola CGISS EME Laboratory
Run #: Face-R1-030207-09
Model #: AAH50RDC9AA2AN SN:018TCW0207
TX Freq: 438 MHz
Sim Tissue Temp: 22.0 (Celsius)

Antenna:NAE6522AR
Battery Kit: NNTN4497A
Carry: none
Audio Acc.: none

DUT microphone towards phantom w/ 2.5 cm separation
Flat Phantom; Device Section; Position: (90°,90°);
Probe: ET3DV6R(cal date 5-21-02) - SN1545; ConvF(7.00,7.00,7.00); Probe cal date: 21/05/02; Crest factor: 1.0; IEEE
Head_454MHz: σ = 0.89 mho/m ε = 43.6 ρ = 1.00 g/cm3; DAE3: 363-V1 DAE Cal Date: 5/23/02
Cube 7x7x7: SAR (1g): 6.91 mW/g, SAR (10g): 5.03 mW/g * Max outside, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 15.0, 124.5, 4.7





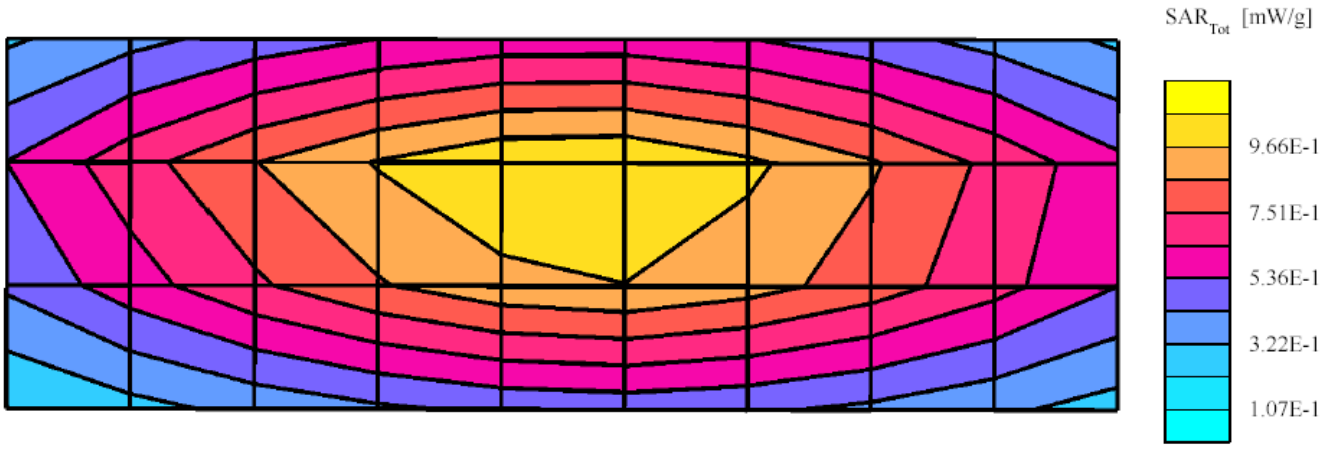
APPENDIX C

Dipole System Performance Check Results

SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date:01/31/03
Motorola CGISS EME Lab
Run #: Sys Perf-R1-030131-01
TX Freq: 450 MHz
Sim Tissue Temp: 21.7 (Celsius)
Start Power; 250mW

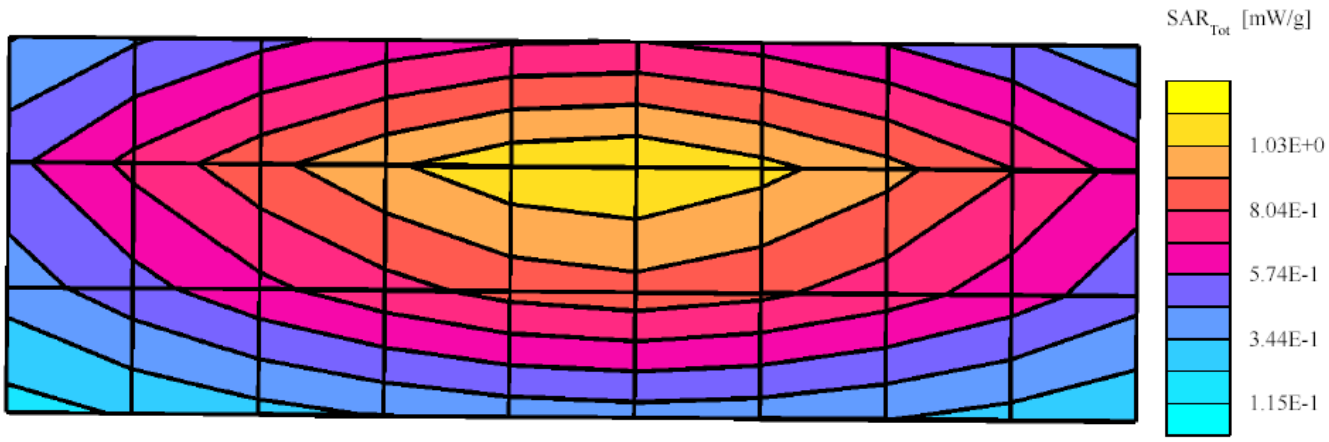
- Comments-
Target at 1W is 4.52 mW/g (including drift) (1g)
SAR calculated is 4.64 mW/g, Percent from target for 1g is 2.65 %

Flat Phantom; Probe: ET3DV6R(cal date 5-21-02) - SN1545;Probe Cal Date: 21/05/02ConvF(7.10,7.10,7.10); Crest factor: 1.0; FCC Body_450 MHz: σ = 0.94 mho/m ε = 55.7 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 1.77 mW/g ± 0.05 dB, SAR (1g): 1.16 mW/g ± 0.06 dB, SAR (10g): 0.766 mW/g ± 0.06 dB, (Worst-case extrapolation) Penetration depth: 12.9 (11.6, 14.6) [mm]
Power drift: 0.01 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date:02/03/03
Motorola CGISS EME Lab
Run #: Sys Perf-R1-030203-01
Model #: SPEAG D450V2 SN: 1002
TX Freq: 450 MHz
Sim Tissue Temp: 21.3 (Celsius)
Start Power; 250mW
- Comments-
Target at 1W is 4.52 mW/g (including drift) (1g)
SAR calculated is 4.68 mW/g, Percent from target (including drift) for 1g is 3.54 %

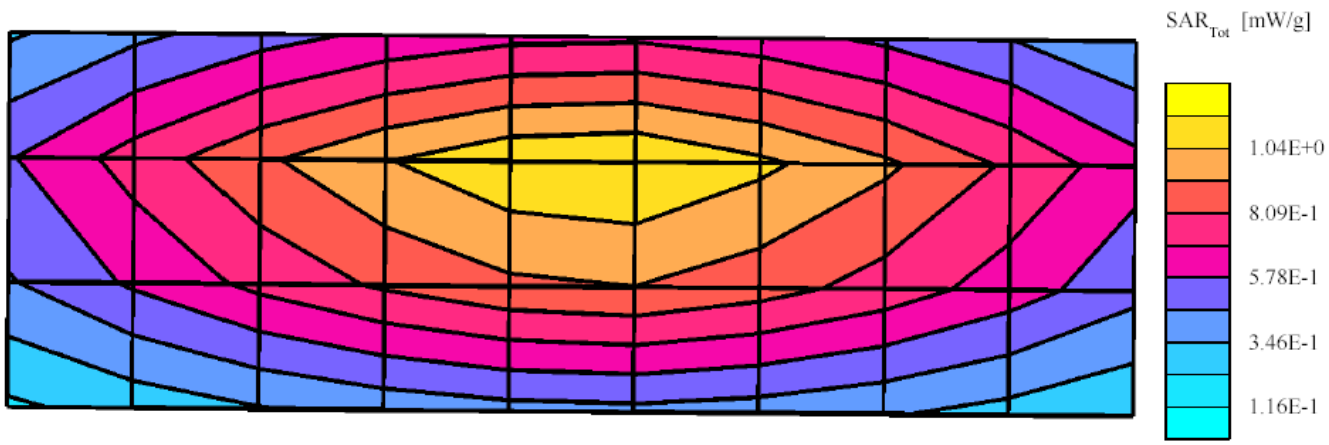
Flat Phantom; Probe: ET3DV6R(cal date 5-21-02) - SN1545;Probe Cal Date: 21/05/02ConvF(7.10,7.10,7.10); Crest factor: 1.0; FCC Body_450 MHz: σ = 0.91mho/m ε = 55.5 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 1.80 mW/g ± 0.08 dB, SAR (1g): 1.17 mW/g ± 0.07 dB, SAR (10g): 0.779 mW/g ± 0.07 dB, (Worst-case extrapolation) Penetration depth: 13.0 (11.6, 14.8) [mm]
Power drift: 0.02 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date:02/04/03
Motorola CGISS EME Lab
Run #: Sys Perf-R1-030204-01
TX Freq: 450 MHz
Sim Tissue Temp: 21.1 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 4.52 mW/g (including drift) (1g)
SAR calculated is 4.80 mW/g, Percent from target (including drift) for 1g is 6.20 %

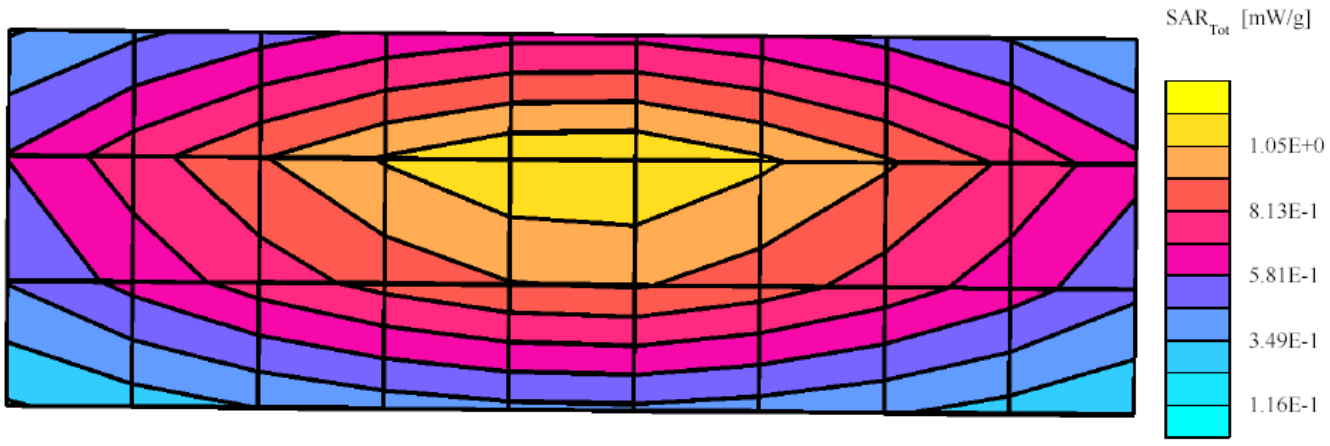
Flat Phantom; Probe: ET3DV6R(cal date 5-21-02) - SN1545;Probe Cal Date: 21/05/02ConvF(7.10,7.10,7.10); Crest factor: 1.0; FCC Body_450 MHz: σ = 0.93mho/m ε = 55.5 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 1.83 mW/g ± 0.07 dB, SAR (1g): 1.20 mW/g ± 0.07 dB, SAR (10g): 0.793 mW/g ± 0.06 dB, (Worst-case extrapolation) Penetration depth: 13.0 (11.6, 14.7) [mm]
Power drift: 0.01 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date:02/05/03
Motorola CGISS EME Lab
Run #: Sys Perf-R1-030205-01
TX Freq: 450 MHz
Sim Tissue Temp: 21.5 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 4.52 mW/g (including drift) (1g)
SAR calculated is 4.84 mW/g, Percent from target (including drift) for 1g is 7.08 %

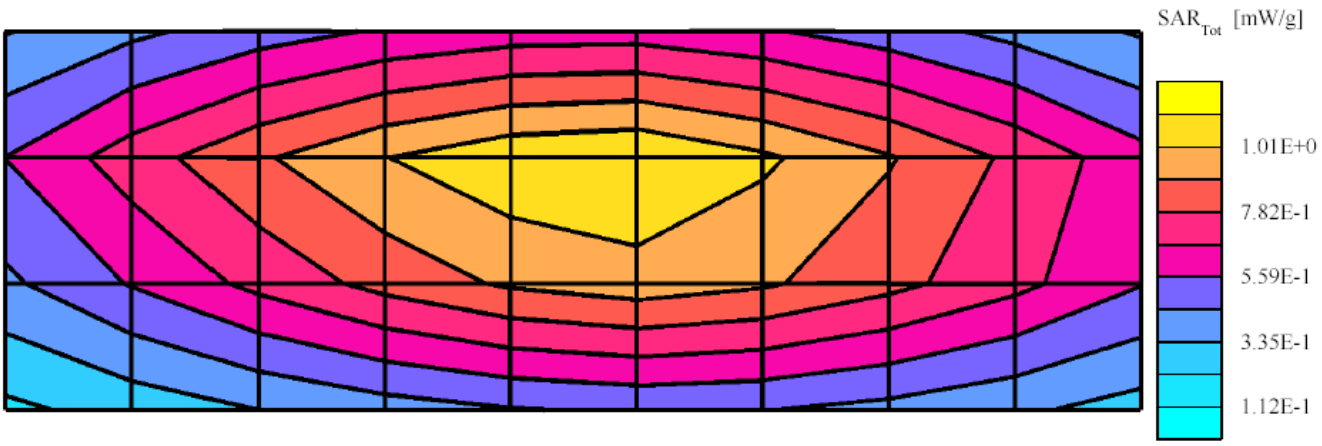
Flat Phantom; Probe: ET3DV6R(cal date 5-21-02) - SN1545;Probe Cal Date: 21/05/02ConvF(7.10,7.10,7.10); Crest factor: 1.0; FCC Body_450 MHz: σ = 0.94 mho/m ε = 55.7 ρ= 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 1.86 mW/g ± 0.09 dB, SAR (1g): 1.21 mW/g ± 0.07 dB, SAR (10g): 0.801 mW/g ± 0.07 dB, (Worst-case extrapolation) Penetration depth: 12.9 (11.6, 14.6) [mm]
Power drift: 0.02 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date:02/06/03
Motorola CGISS EME Lab
Run #: Sys Perf-R1-030206-03
Model #: SPEAG D450V2 SN: 1002
TX Freq: 450 MHz
Sim Tissue Temp: 21.5 (Celsius)
Start Power; 250mW

Target at 1W is 4.70 mW/g (including drift) (1g)
SAR calculated is 4.72 mW/g, Percent from target (including drift) for 1g is 0.43 %

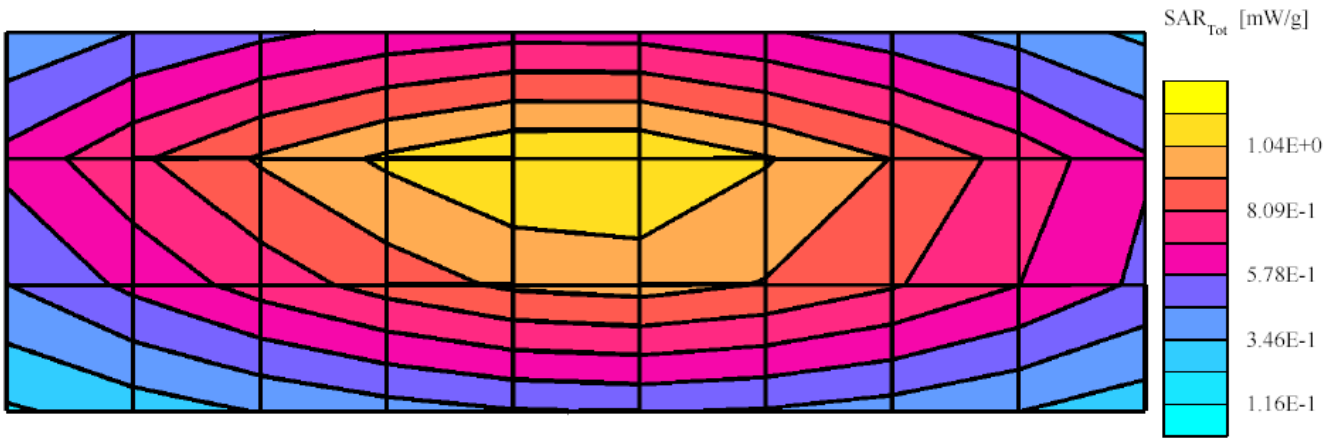
Flat Phantom;Probe: ET3DV6R(cal date 5-21-02) - SN1545;Probe Cal Date: 21/05/02ConvF(7.00,7.00,7.00); Crest factor: 1.0; IEEE Head_450MHz: σ = 0.85mho/m ε = 42.1 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 1.83 mW/g ± 0.06 dB, SAR (1g): 1.18 mW/g ± 0.06 dB, SAR (10g): 0.772 mW/g ± 0.06 dB, (Worst-case extrapolation) Penetration depth: 12.5 (11.3, 14.1) [mm]
Power drift: -0.00 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date:02/07/03
Motorola CGISS EME Lab
Run #: Sys Perf-R1-030207-01
TX Freq: 450 MHz
Sim Tissue Temp: 21.5 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 4.70 mW/g (including drift) (1g)
SAR calculated is 4.88 mW/g, Percent from target (including drift) for 1g is 3.83 %

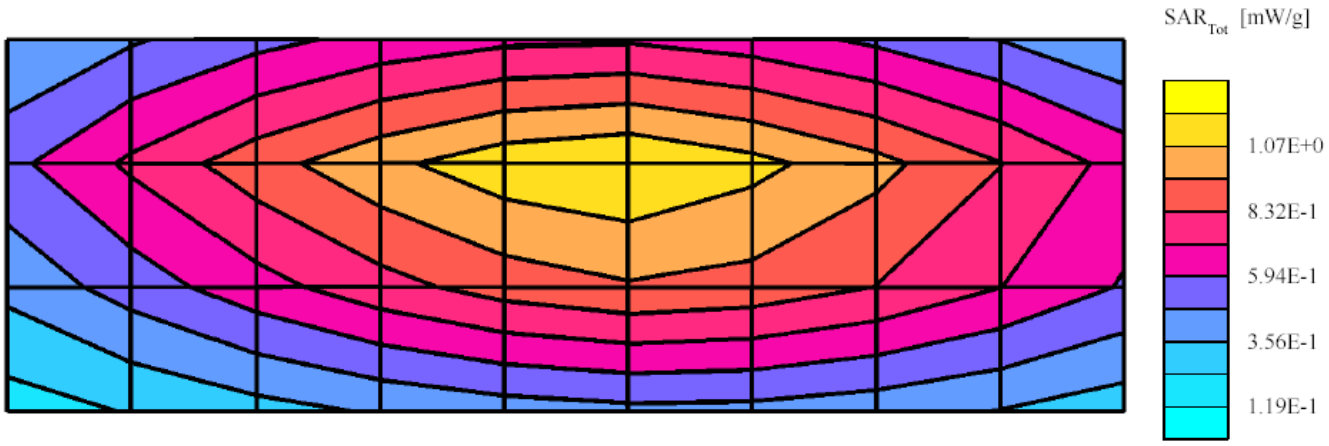
Flat Phantom; Probe: ET3DV6R(cal date 5-21-02) - SN1545;Probe Cal Date: 21/05/02ConvF(7.10,7.10,7.10); Crest factor: 1.0; FCC Body_450 MHz: σ = 0.89 mho/m ε = 43.7 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 1.89 mW/g ± 0.08 dB, SAR (1g): 1.22 mW/g ± 0.07 dB, SAR (10g): 0.799 mW/g ± 0.06 dB, (Worst-case extrapolation) Penetration depth: 12.7 (11.4, 14.3) [mm]
Power drift: 0.00 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date:02/10/03
Motorola CGISS EME Lab
Run #: Sys Perf-R1-030210-01
TX Freq: 450 MHz
Sim Tissue Temp: 21.0 (Celsius)
Start Power; 250mW

- Comments-
Target at 1W is 4.70 mW/g (including drift) (1g)
SAR calculated is 4.89 mW/g, Percent from target (including drift) for 1g is 4.07 %

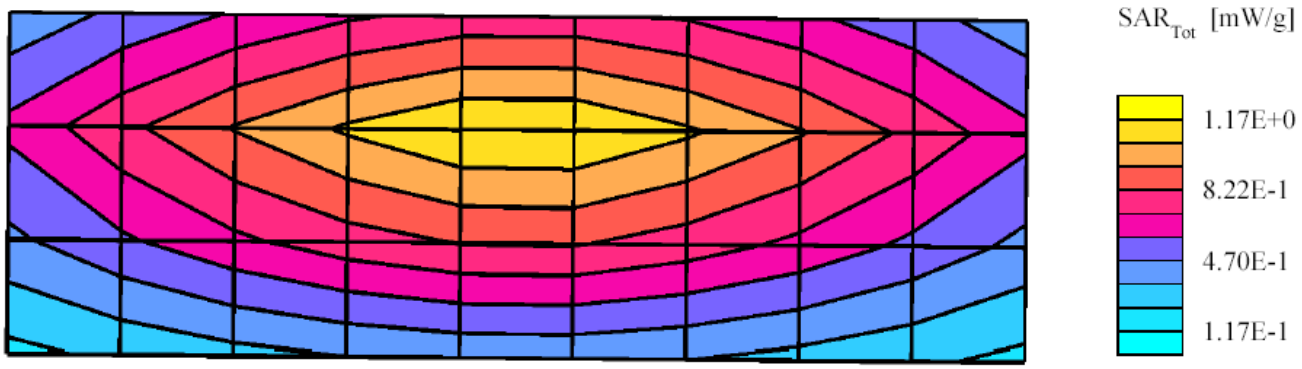
Flat Phantom; Probe: ET3DV6R(cal date 5-21-02) - SN1545;Probe Cal Date: 21/05/02ConvF(7.10,7.10,7.10); Crest factor: 1.0; FCC Body_450 MHz: σ = 0.88 mho/m ε = 44.0 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): Peak: 1.88 mW/g ± 0.07 dB, SAR (1g): 1.22 mW/g ± 0.07 dB, SAR (10g): 0.801 mW/g ± 0.06 dB, (Worst-case extrapolation) Penetration depth: 12.7 (11.4, 14.3) [mm]
Power drift: -0.01 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date:02/18/03
Motorola CGISS EME Lab
Run #: Sys Perf-R1-030218-04
TX Freq: 450 MHz
Sim Tissue Temp: 21.1 (Celsius)
Start Power; 250mW

Target at 1W is 4.70 mW/g (including drift) (1g)
SAR calculated is 4.80 mW/g, Percent from target for 1g is 2.13 %

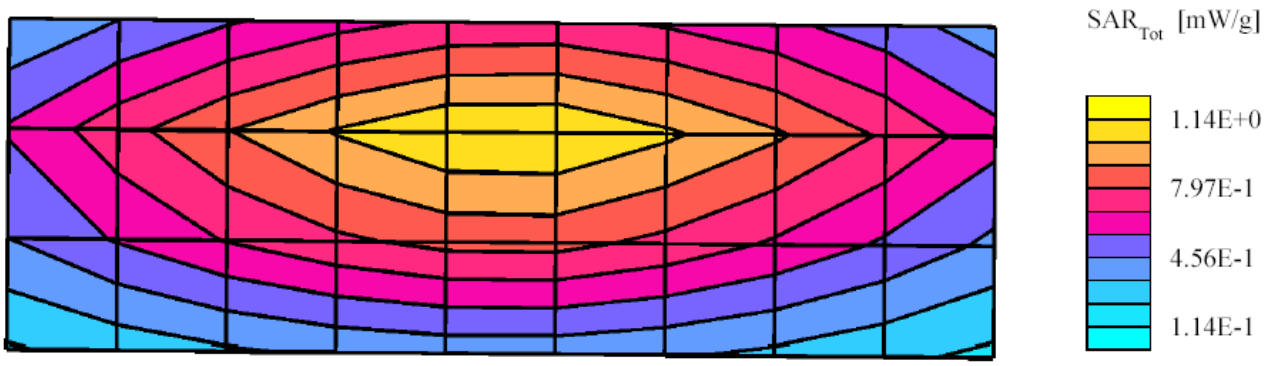
Flat Phantom; Probe: ET3DV6R SN1545 (cal date 5-21-02) - SN1545;Probe Cal Date: 21/05/02ConvF(7.00,7.00,7.00); Crest factor: 1.0; IEEE Head_450MHz: σ = 0.87 mho/m ε= 43.7 ρ= 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): SAR (1g): 1.20 mW/g ± 0.05 dB, SAR (10g): 0.789 mW/g ± 0.06 dB, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 67.5, 31.5, 4.7
Power drift: 0.01 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date:02/19/03
Motorola CGISS EME Lab
Run #: Sys Perf-R1-030219-01
Model #: SPEAG D450V2 SN: 1002
TX Freq: 450 MHz
Sim Tissue Temp: 21.1 (Celsius)
Start Power; 250mW

Target at 1W is 4.70 mW/g (including drift) (1g)
SAR calculated is 4.73 mW/g, Percent from target (including drift) for 1g is 0.64 %

Flat Phantom: Probe: ET3DV6R SN1545 (cal date 5-21-02) - SN1545; ConvF(7.00,7.00,7.00); Probe cal date: 21/05/02; Crest factor: 1.0; IEEE Head_450MHz: σ = 0.84 mho/m ε = 42.9 ρ = 1.00 g/cm3; DAE3: SN363-V1 DAE Cal Date: 05/23/02
Cubes (2): SAR (1g): 1.16 mW/g ± 0.05 dB, SAR (10g): 0.767 mW/g ± 0.05 dB, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 69.0, 30.0, 4.7
Power drift: -0.08



SYSTEM PERFORMANCE CHECK TARGET SAR

Date:	1/16/2003	Frequency (MHz):	450
Lab Location:	CGISS	Mixture Type:	FCC Body
Robot System:	CGISS 3	Ambient Temp.(°C):	22.6, (Humid: 45%)
Probe Serial #:	ET3DV6-1393	Tissue Temp.(°C):	21.5
DAE Serial #:	406		

Tissue Characteristics

Permitivity:	55.4	Phantom Type/SN:	80302002C/S7
Conductivity:	0.92	Distance (mm):	15 (tissue/dipole cnt)

Reference Source: D450V2 (Dipole)
Reference SN: 1002

Power to Dipole: 250 mW

Measured SAR Value: 1.13 mW/g, 0.748 mW/g (10g avg.)
Power Drift: 0 dB

New Target/Measured
SAR Value: 4.52 mW/g, 2.99 mW/g (10g avg.)
(normalized to 1.0 W, including drift)

Test performed by: J. Fortier Initial:

Dipole D450V2 SN1002; Test date:01/16/03

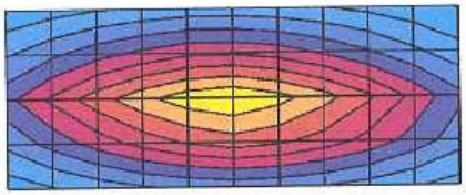
Run #: Sys Val_R3_030116-07
Model #: D450V2
Robot: CGISS-3
TX Freq: 450 MHz
Start Power; 250mW
DAE3: SN:406

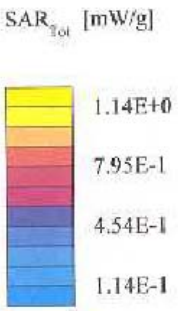
Phantom #:80302002C/S7
SN: 1002
Tester: J. Fortier
Sim Tissue Temp: 21.5 (Celsius)

DAE Cal Date: 11/11/02

- Comments-

Target at 1W is 4.52 mW/g (1g), 2.99 mW/g (10g)
Flat; Probe: ET3DV6 - SN1393 SPEAG; ConvF(8.20,8.20,8.20); Crest factor: 1.0; FCC Body 450: σ = 0.92 mho/m ε_r = 55.4 ρ = 1.00 g/cm^3
Cubes (2): Peak: 1.74 mW/g ± 0.06 dB, SAR (1g): 1.13 mW/g ± 0.06 dB, SAR (10g): 0.748 mW/g ± 0.06 dB, (Worst-case extrapolation)
Penetration depth: 13.1 (11.6, 14.9) [mm]
Powerdrift: -0.00 dB





SYSTEM PERFORMANCE CHECK TARGET SAR

Date:	1/16/2003	Frequency (MHz):	450
Lab Location:	CGISS	Mixture Type:	IEEE Head
Robot System:	CGISS 3	Ambient Temp.(°C):	22.6, (Humid: 46.4%)
Probe Serial #:	ET3DV6-1393	Tissue Temp.(°C):	21.2
DAE Serial #:	406		

Tissue Characteristics

Permitivity:	43.3	Phantom Type/SN:	80302002B/S6
Conductivity:	0.87	Distance (mm):	15 (tissue/dipole cnt)

Reference Source:	D450V2	(Dipole)
Reference SN:	1002	

Power to Dipole: 250 mW

Measured SAR Value:	1.17 mW/g,	0.774 mW/g (10g avg.)	
Power Drift:	-0.02 dB		

New Target/Measured SAR Value: (normalized to 1.0 W, including drift)	4.70 mW/g,	3.11 mW/g (10g avg.)

Test performed by: J. Fortier Initial:

Sys. Per. Chk. Form: 021024

Dipole D450V2 SN1002; Test date:01/16/03

Run #: Sys Val_R3_030116-04
Model #: D450V2
Robot: CGISS-3
TX Freq: 450 MHz
Start Power: 250mW
DAE3: SN:406

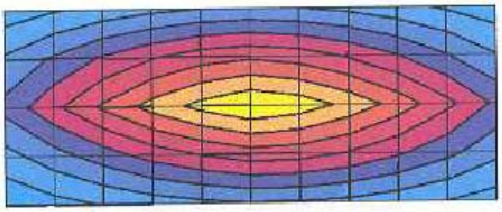
Phantom #:80302002B/S6
SN: 1002
Tester: J. Fortier
Sim Tissue Temp: 21.2 (Celsius)

DAE Cal Date: 11/11/02

- Comments-

Target at 1W is 4.9 mW/g (1g)

SAR calculated is 4.7 mW/g, Percent from IEEE-1528 target (including drift) for 1g is 4.0%
Flat; Probe: ET3DV6 - SN1393 SPEAG; ConvF(8.00,8.00,8.00); Crest factor: 1.0; IEEE Head 450 MHz: σ = 0.87 mho/m ε_r = 43.3 ρ = 1.00 g/cm^3
Cubes (2): Peak: 1.81 mW/g ± 0.05 dB, SAR (1g): 1.17 mW/g ± 0.05 dB, SAR (10g): 0.774 mW/g ± 0.06 dB, (Worst-case extrapolation)
Penetration depth: 12.8 (11.4, 14.5) [mm]
Powerdrift: -0.02 dB



Motorola CGISS EME Lab

APPENDIX D

Calibration Certificates

Schmid & Partner
Engineering AG

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

Calibration Certificate

Dosimetric E-Field Probe

Type:	ET3DV6R
Serial Number:	1545
Place of Calibration:	Zurich
Date of Calibration:	May 21, 2002
Calibration Interval:	12 months

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

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

Calibrated by:	
Approved by:	

DASY3 - Parameters of Probe: ET3DV6R SN:1545

Sensitivity in Free Space

NormX	2.04 $\mu V/(V/m)^2$		DCP X	95	mV
NormY	2.11 $\mu V/(V/m)^2$		DCP Y	95	mV
NormZ	1.79 $\mu V/(V/m)^2$		DCP Z	95	mV

Sensitivity in Tissue Simulating Liquid

Head	**900 MHz**	ε_r = 41.5 ± 5%	σ = 0.97 ± 5% mho/m		
Head	**835 MHz**	ε_r = 41.5 ± 5%	σ = 0.90 ± 5% mho/m		
	ConvF X	**6.1** ± 9.5% (k=2)	Boundary effect:		
	ConvF Y	**6.1** ± 9.5% (k=2)	Alpha	**0.40**	
	ConvF Z	**6.1** ± 9.5% (k=2)	Depth	**2.47**	
Head	**1800 MHz**	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m		
Head	**1900 MHz**	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m		
	ConvF X	**5.0** ± 9.5% (k=2)	Boundary effect:		
	ConvF Y	**5.0** ± 9.5% (k=2)	Alpha	**0.57**	
	ConvF Z	**5.0** ± 9.5% (k=2)	Depth	**2.25**	

Boundary Effect

Head **900 MHz** **Typical SAR gradient: 5 % per mm**

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	10.3	5.8
SAR_{be} [%]	With Correction Algorithm	0.4	0.5

Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	12.3	7.9
SAR_{be} [%]	With Correction Algorithm	0.2	0.2

Sensor Offset

Probe Tip to Sensor Center	2.7	mm

Schmid & Partner
Engineering AG

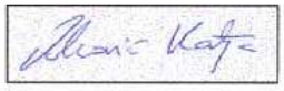
Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6R**
Serial Number:	**1545**
Place of Assessment:	**Zurich**
Date of Assessment:	**May 23, 2002**
Probe Calibration Date:	**May 21, 2002**

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by: 

Dosimetric E-Field Probe ET3DV6R SN:1545

Conversion factor (± standard deviation)

150 MHz	ConvF	**7.8 ± 8%**	ε_r = **61.9** ±5% σ = **0.80** ±5% **mho/m** (body tissue)
236 MHz	ConvF	**7.6 ± 8%**	ε_r = **59.8** ±5% σ = **0.87** ±5% **mho/m** (body tissue)
300 MHz	ConvF	**7.5 ± 8%**	ε_r = **58.2** ±5% σ = **0.92** ±5% **mho/m** (body tissue)
350 MHz	ConvF	**7.3 ± 8%**	ε_r = **57.7** ±5% σ = **0.93** ±5% **mho/m** (body tissue)
450 MHz	ConvF	**7.1 ± 8%**	ε_r = **56.7** ±5% σ = **0.94** ±5% **mho/m** (body tissue)
784 MHz	ConvF	**6.1 ± 8%**	ε_r = **55.4** ±5% σ = **0.97** ±5% **mho/m** (body tissue)
835 MHz	ConvF	**6.0 ± 8%**	ε_r = **55.2** ±5% σ = **0.97** ±5% **mho/m** (body tissue)
925 MHz	ConvF	**5.9 ± 8%**	ε_r = **55.0** ±5% σ = **1.06** ±5% **mho/m** (body tissue)
1450 MHz	ConvF	**5.1 ± 8%**	ε_r = **54.0** ±5% σ = **1.30** ±5% **mho/m** (body tissue)
1900 MHz	ConvF	**4.4 ± 8%**	ε_r = **53.3** ±5% σ = **1.52** ±5% **mho/m** (body tissue)
2450 MHz	ConvF	**3.7 ± 8%**	ε_r = **52.7** ±5% σ = **1.95** ±5% **mho/m** (body tissue)

Dosimetric E-Field Probe ET3DV6R SN:1545

Conversion factor (± standard deviation)

150 MHz	ConvF	**8.5 ± 8%**	ε_r = 52.3 ±5% σ = 0.76 ±5% mho/m (head tissue)
236 MHz	ConvF	**7.7 ± 8%**	ε_r = 48.3 ±5% σ = 0.82 ±5% mho/m (head tissue)
300 MHz	ConvF	**7.3 ± 8%**	ε_r = 45.3 ±5% σ = 0.87 ±5% mho/m (head tissue)
350 MHz	ConvF	**7.2 ± 8%**	ε_r = 44.7 ±5% σ = 0.87 ±5% mho/m (head tissue)
400 MHz	ConvF	**7.1 ± 8%**	ε_r = 44.4 ±5% σ = 0.87 ±5% mho/m (head tissue - CENELEC)
450 MHz	ConvF	**7.0 ± 8%**	ε_r = 43.5 ±5% σ = 0.87 ±5% mho/m (head tissue)
784 MHz	ConvF	**6.3 ± 8%**	ε_r = 41.8 ±5% σ = 0.90 ±5% mho/m (head tissue)
835 MHz	ConvF	**6.2 ± 8%**	ε_r = 41.5 ±5% σ = 0.90 ±5% mho/m (head tissue)
835 MHz	ConvF	**6.2 ± 8%**	ε_r = 42.5 ±5% σ = 0.98 ±5% mho/m (head tissue - CENELEC)
925 MHz	ConvF	**6.1 ± 8%**	ε_r = 41.5 ±5% σ = 0.98 ±5% mho/m (head tissue)
900 MHz	ConvF	**6.1 ± 8%**	ε_r = 42.3 ±5% σ = 0.99 ±5% mho/m (head tissue - CENELEC)

Dosimetric E-Field Probe ET3DV6R SN:1545

Conversion factor (± standard deviation)

1500 MHz	ConvF	**5.4 ± 8%**	ε_r = 40.4 σ = 1.23 mho/m (head tissue)
1900 MHz	ConvF	**4.8 ± 8%**	ε_r = 40.0 ±5% σ = 1.40 ±5% mho/m (head tissue)
2450 MHz	ConvF	**4.1 ± 8%**	ε_r = 39.2 ±5% σ = 1.80 ±5% mho/m (head tissue)

Schmid & Partner
Engineering AG

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

Calibration Certificate

450 MHz System Validation Dipole

Type:	D450V2
Serial Number:	1002
Place of Calibration:	Zurich
Date of Calibration:	April 5, 2002
Calibration Interval:	24 months

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

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

Calibrated by:	Volkert Katz
Approved by:	

1. Measurement Conditions

The measurements were performed in the flat phantom filled with head simulating liquid of the following electrical parameters at 450 MHz:

Relative Dielectricity	**44.5**	± 5%
Conductivity	**0.86 mho/m**	± 5%

The DASY3 System (Software version 3.1d) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 7.2 at 450 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom and the dipole was oriented parallel to the longer side of the phantom. The standard measuring distance was 15mm from dipole center to the liquid surface including the 6mm thick phantom shell. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 20mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging.
The dipole input power (forward power) was 389 mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement

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

averaged over 1 cm^3 (1 g) of tissue:	**4.81 mW/g** (Advanced Extrapolation)
averaged over 10 cm^3 (10 g) of tissue:	**3.19 mW/g** (Advanced Extrapolation)

Advanced extrapolation has been applied to the measured SAR values to compensate for the probe boundary effect (see DASY User Manual for details).

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

3. Dipole Impedance and Return Loss

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

Electrical delay:	**1.347 ns**	(one direction)
Transmission factor:	**0.997**	(voltage transmission, one direction)

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

Feedpoint impedance at 450 MHz:	Re{Z} = **57.2 Ω**
	Im {Z} = **-5.2 Ω**
Return Loss at 450 MHz	**-21.7 dB**

4. Handling

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

5. Design

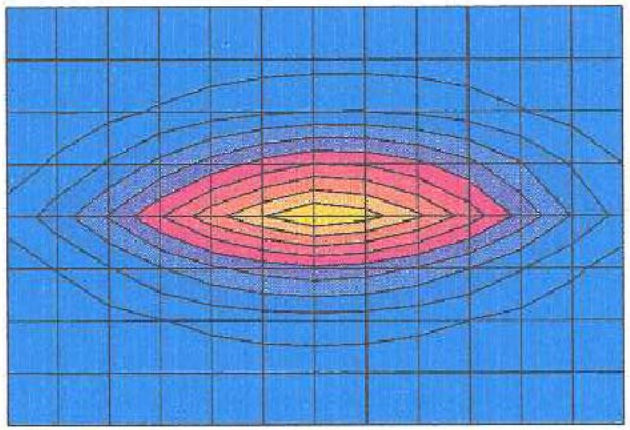
The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

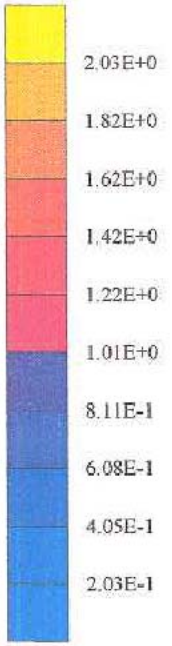
6. Power Test

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

Validation Dipole D450V2 SN:1002, d = 15 mm

Frequency: 450 MHz; Antenna Input Power: 389 [mW]
Phantom Name: Calibration, Grid Spacing: Dx = 20.0, Dy = 20.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(7.20,7.20,7.20); Crest factor: 1.0; Head 450 MHz: $\sigma = 0.86$ mho/m $\varepsilon_r = 44.5$ $\rho = 1.00$ g/cm^3
Cubes (2): Peak: 2.84 mW/g ± 0.03 dB, SAR (1g): 1.87 mW/g ± 0.03 dB, SAR (10g): 1.24 mW/g ± 0.03 dB , (Advanced extrapolation)
Penetration depth: 13.0 (11.9, 14.4) [mm]





APPENDIX E
Illustration of Body-Worn Accessories

The purpose of this appendix is to illustrate the body-worn carry accessories for FCC ID: ABZ99FT4056. The sample that was used in the following photos represents the product used to obtain the results presented herein and was used in this section to demonstrate the different body-worn accessories.

Photo 1.
Model HLN8255B
Back View

Photo 2.
Model HLN8255B
Side View

Photo 3.
Model PMLN4124A
Back View

Photo 4.
Model PMLN4124A
Side View

Photo 5.
Model HLN9701B
Back View

Photo 6.
Model HLN9701B
Front View

Photo 7.
Model HLN9701B
Side View

Photo 8.
Model RLN5383A
Back View

Photo 9.
Model RLN5383A
Front View

Photo 10.
Model RLN5383A
Side View

Photo 11.
Model RLN5384A
Back View

Photo 12.
Model RLN5384A
Front View

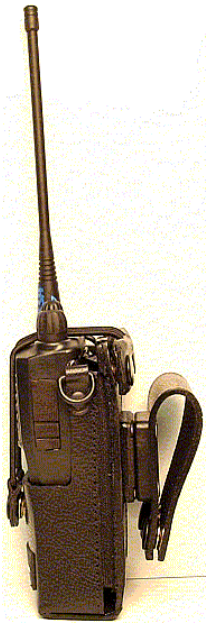


Photo 13.
Model RLN5384A
Side View

Photo 14.
Model RLN5385A
Back View

Photo 15.
Model RLN5385A
Front View

Photo 16.
Model RLN5385A
Side View

Photo 17.
RLN4815A
Universal Radio Pack

Photo 18.
HLN6602A
Universal Chest Pack

Photo 19.
NTN5243A
Shoulder Carry Strap

Photo 20.
RLN4570A
Break-Away Chest Pack

Photo 21.
1505596Z02
Belt lengthener for RLN4815A

Photo 22.
4280384F89
Replacement strap for HLN6602 Chest Pack

Appendix F
Accessories and options test status and separation distances

The following table summarizes the body spacing distance provided by each of the body-worn accessories:

Carry Case Model	Tested ?	Separation distance between device and phantom surface. (mm)	Comments
HLN6602A	Yes	26	NA
RLN4815A	Yes	45	NA
NTN5243A	Yes	50	Tested with carry case
HLN8255B	Yes	38	NA
HLN9701B	Yes	45	NA
RLN5383A	Yes	50	NA
RLN5385A	Yes	62	NA
RLN5384A	No	62	Similar to RLN5385A
4280384F89	No	-	Replacement belt lengthener for RLN4815A No metallic parts
1505596Z02	No	-	Replacement strap for HLN6602A No metallic parts
RLN4570A	No	26	Similar to HLN6602A
Audio Acc. Model	**Tested ?**	**Separation distance between device and phantom surface. (mm)**	**Comments**
HMN9030A	Yes	NA	NA
HMN9754D	Yes	NA	NA
PMMN4001A	Yes	NA	NA
HMN9013A	Yes	NA	NA
RMN4016A	Yes	NA	NA
RLN5238A	Yes	NA	NA
HMN9021A	Yes	NA	NA
BDN6647F	Yes	NA	NA
BDN6648C	Yes	NA	NA
RMN5015A	Yes	NA	NA
RKN4090A	Yes	NA	tested with RMN5015A
RLN5411A	Yes	NA	NA
HMN9727B	No	NA	Receive only
RLN4894A	No	NA	Receive only
HMN9752B	No	NA	Receive only
RLN4895A	No	NA	Similar to HMN9754D
HMN9036A	No	NA	Similar to HMN9754D
HLN9132A	No	NA	Receive only
RLN5198AP	No	NA	Similar to HMN9754D
BDN6720A	No	NA	Receive only
HMN9022A	No	NA	Similar HMN9021A