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:	July 25, 2003
Report Revision:	Rev. O
Manufacturer:	Motorola
Product Description:	Portable 465-495 MHz 1-4W 16 Channel
FCC ID:	**ABZ99FT4058**
Device Model:	AAH50SDC9AA2AN

Test Period:	5/19/03-5/23/03
EME Tech:	Ed Church
EME Engineer:	Deanna Zakharia Elect. Principle Staff Engineer
Author:	Michael Sailsman Global EME Regulatory Affairs Liaison

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 — 7/25/03

Deanna Zakharia (Elect. Principle Staff Eng.) for Ken Enger
Senior Resource Manager, Laboratory Director, CGISS EME Lab

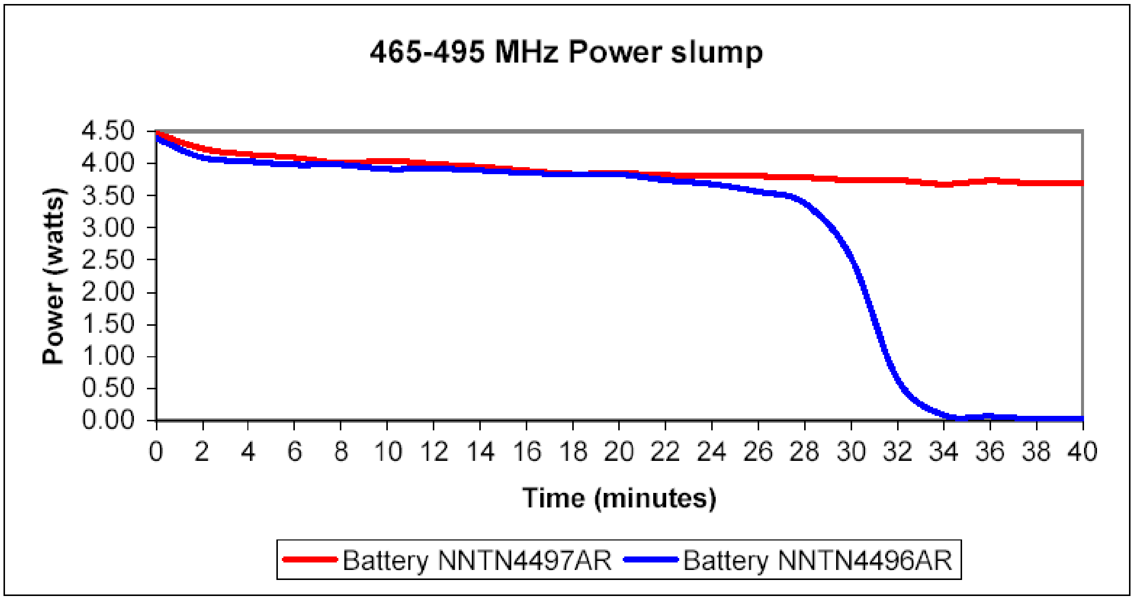
Date Approved

APPENDIX A

Power Slump Data/Shortened Scan

DUT Power versus time data

	Battery NNTN4497AR Power (watts)	Battery NNTN4496AR Power (watts)
0	4.47	4.39
2	4.23	4.09
4	4.14	4.03
6	4.09	3.98
8	4.00	3.98
10	4.04	3.91
12	3.99	3.92
14	3.95	3.89
16	3.89	3.85
18	3.84	3.83
20	3.85	3.83
22	3.82	3.74
24	3.81	3.68
26	3.80	3.56
28	3.78	3.38
30	3.74	2.53
32	3.74	0.64
34	3.68	0.09
36	3.73	0.07
38	3.69	0.03
40	3.70	0.04



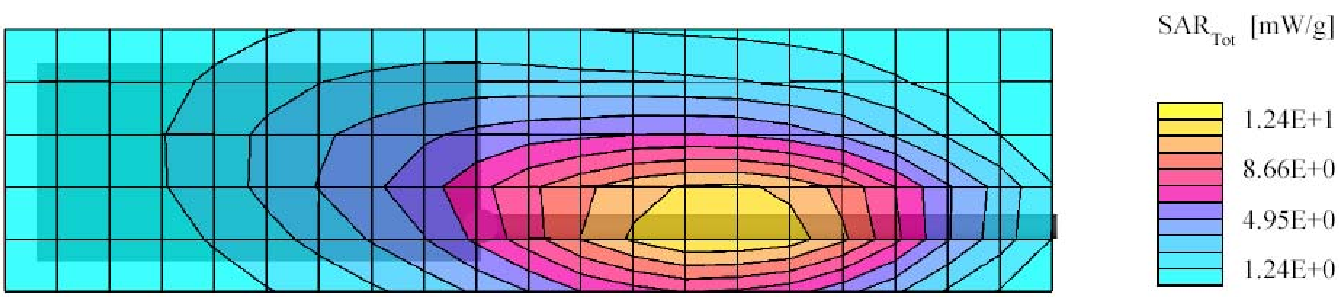
Shortened Scan Results

FCC ID: ABZ99FT4058; Test Date: 5/22/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030522-15 PHANTOM
MODEL #: AAH50SDC9AA2AN SER #: 032UHF0064
TX FREQ: 495 MHz
SIM TEMP: 20.7 C

ANTENNA KIT #: NAE6483AR
BATTERY KIT #: NNTN4497AR
ACCESSORIES: CHEST PACK #: HLN6602A
AUDIO ACCESSORIES: Earpiece #: HMN9754D

Shortened scan reflect highest S.A.R. producing configuration at the abdomen.
Run time 7 minutes
Representative "normal" scan run time was 30 minutes
"Shortened" scan; max calc. S.A.R. (drift adjusted) w/ 50% duty cycle = 6.04 mW/g
"Normal" scan; max. calc. S.A.R. (drift adjusted) w/ 50% duty cycle = 6.84mW/g
(see section 7.1 run # EC-Ab-030521-19)

DUT w/ body worn accessory against the phantom
Flat Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1393; ConvF(8.00,8.00,8.00); Probe cal date: 16/04/03; Crest factor: 1.0; FCC Body 480: σ = 0.95 mho/m ε = 55.6 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 02-19-03
Cube 5x5x7: SAR (1g): 10.1 mW/g, SAR (10g): 7.09 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 55.5, 202.5, 3.6
Power drift: -0.63 dB

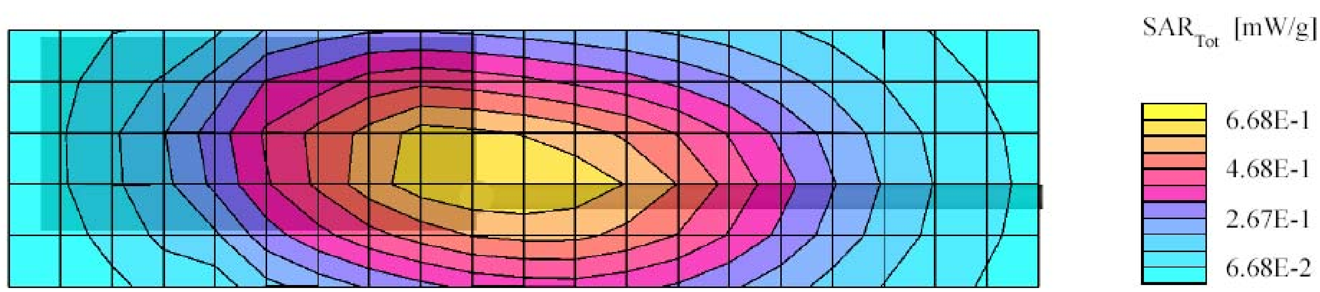


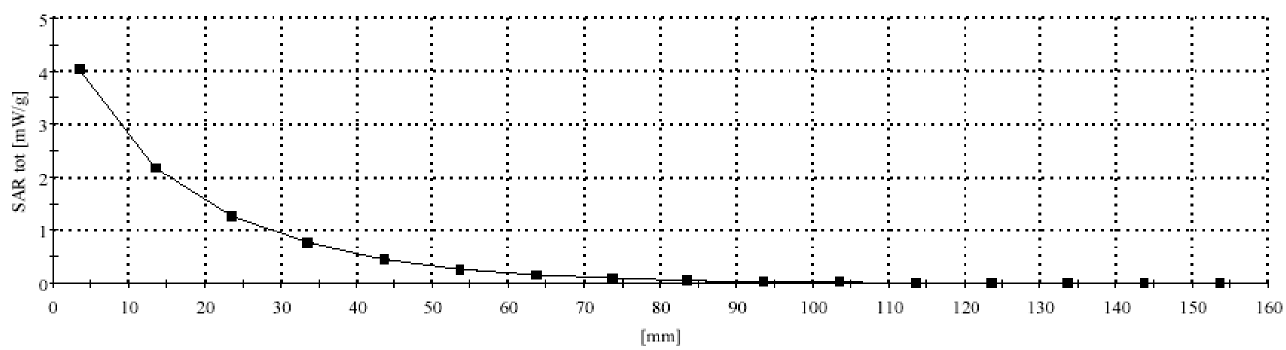
APPENDIX B
Data Results

FCC ID: ABZ99FT4058; Test Date: 5/19/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030519-12
MODEL #: AAH50SDC9AA2AN SER #: 032UHF0064
TX FREQ: 480 MHz
SIM TEMP: 20.5 C

ANTENNA KIT #: NAE6483AR
BATTERY KIT #: NNTN4497AR
ACCESSORIES: BELT CLIP #: HLN8255B
AUDIO ACCESSORIES: RSM #: HMN9030A

DUT w/ belt clip against the flat phantom
Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1393; ConvF(8.00,8.00,8.00); Probe cal date: 16/04/03; Crest factor: 1.0; FCC Body 415: σ = 0.93 mho/m ε = 57.3 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 02-19-03
Cube 5x5x7: SAR (1g): 3.83 mW/g, SAR (10g): 2.76 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 43.5, 142.5, 3.6
Power drift: -0.45 dB

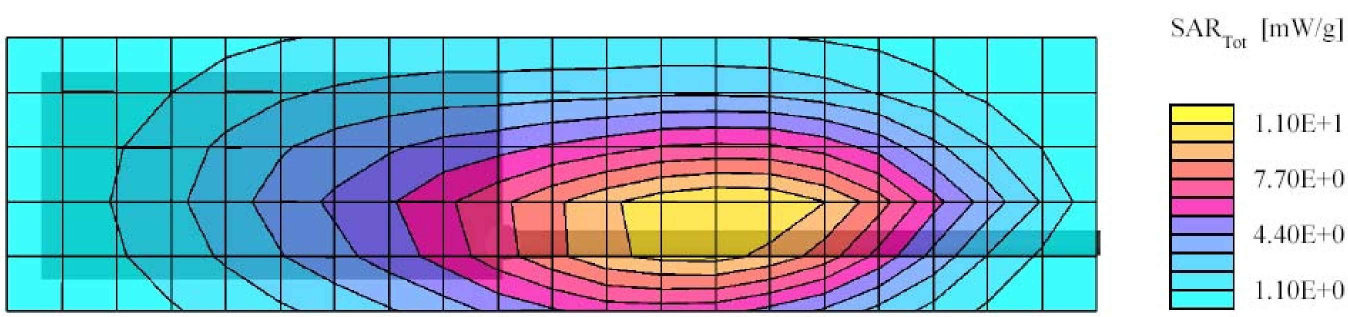


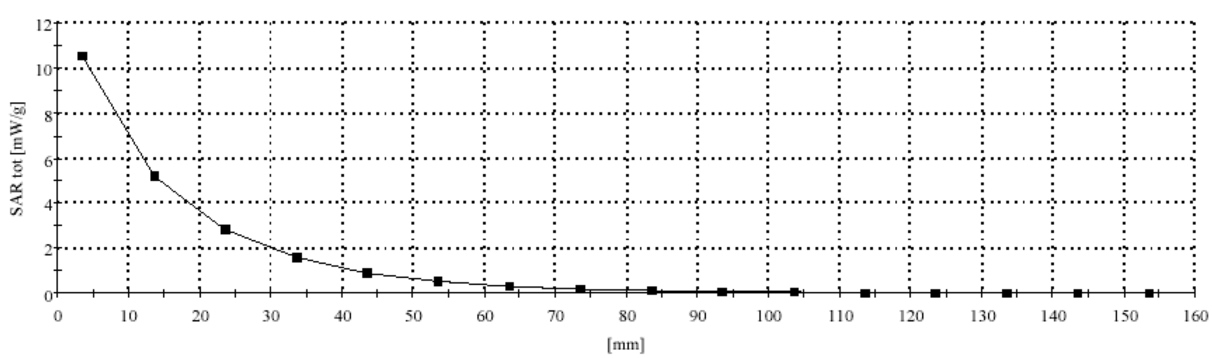


FCC ID: ABZ99FT4058; Test Date: 5/20/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030520-14
MODEL #: AAH50SDC9AA2AN SER #: 032UHF0064
TX FREQ: 495 MHz
SIM TEMP: 20.8 C

ANTENNA KIT #: NAE6483AR
BATTERY KIT #: NNTN4497AR
ACCESSORIES: CHEST PACK #: HLN6602A
AUDIO ACCESSORIES: RSM #: HMN9030A

DUT w/ chest pack against the flat phantom
Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1393; ConvF(8.00,8.00,8.00); Probe cal date: 16/04/03; Crest factor: 1.0; FCC Body 480: σ = 0.98 mho/m ε = 56.3 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 02-19-03
Cube 5x5x7: SAR (1g): 9.85 mW/g, SAR (10g): 6.85 mW/g * Max outside, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 49.5, 196.5, 3.6
Power drift: -0.94 dB
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.

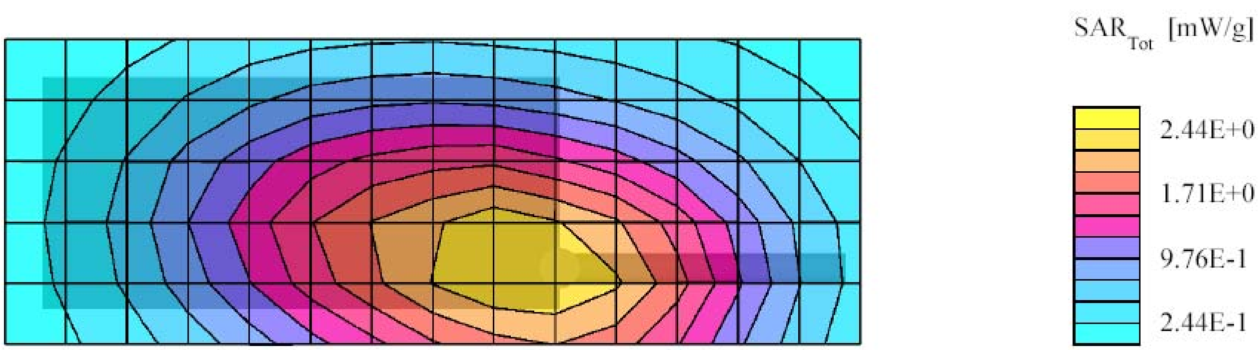


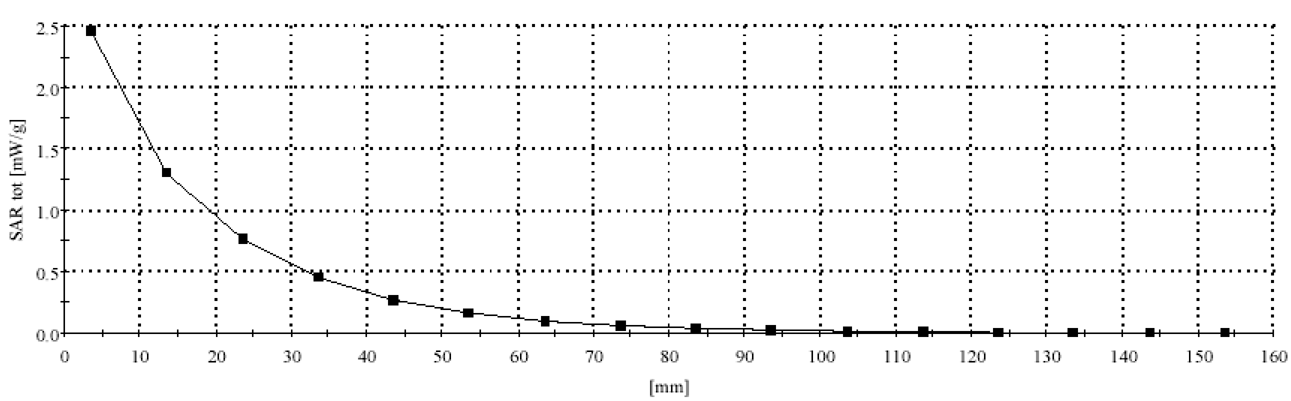


FCC ID: ABZ99FT4058; Test Date: 5/21/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030521-02
MODEL #: AAH50SDC9AA2AN SER #: 032UHF0064
TX FREQ: 480 MHz
SIM TEMP: 20.7 C

ANTENNA KIT #: 8505816K26
BATTERY KIT #: NNTN4496AR
ACCESSORIES: Belt Clip #: HLN8255B
AUDIO ACCESSORIES: RSM #: HMN9030A

DUT w/ belt clip against the flat phantom
Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1393; ConvF(8.00,8.00,8.00); Probe cal date: 16/04/03; Crest factor: 1.0; FCC Body 480: σ = 0.98 mho/m ε = 56.5 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 02-19-03
Cube 5x5x7: SAR (1g): 2.28 mW/g, SAR (10g): 1.65 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 54.0, 124.5, 3.6
Power Drift: -0.23 dB

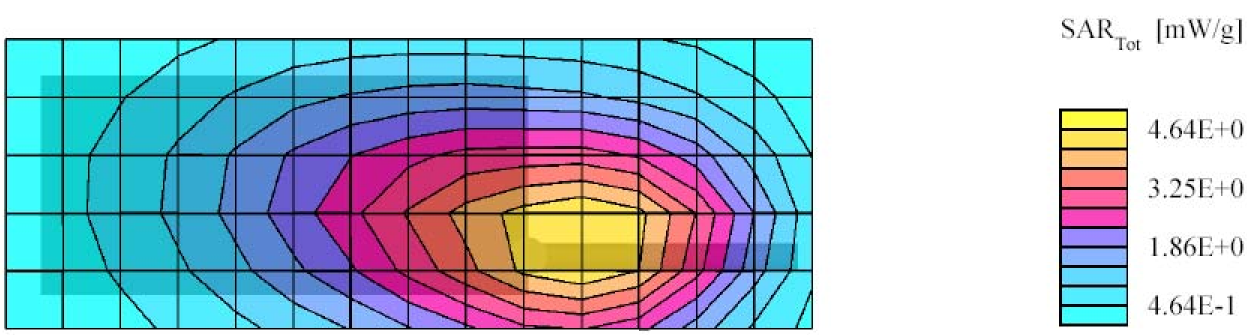


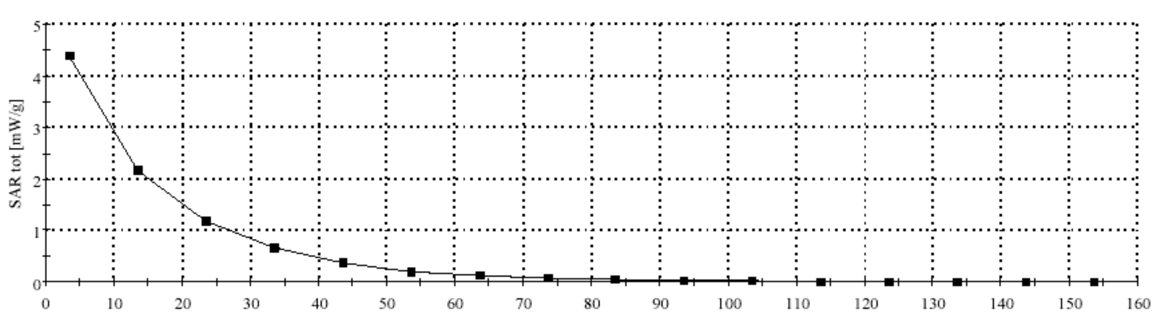


FCC ID: ABZ99FT4058; Test Date: 5/21/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030521-12
MODEL #: AAH50SDC9AA2AN SER #: 032UHF0064
TX FREQ: 495 MHz
SIM TEMP: 20.4 C

ANTENNA KIT #: 8505816K26
BATTERY KIT #: NNTN4496AR
ACCESSORIES: CHEST PACK #: HLN6602A
AUDIO ACCESSORIES: RSM #: HMN9030A

DUT w/ chest pack against the flat phantom
Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1393; ConvF(8.00,8.00,8.00); Probe cal date: 16/04/03; Crest factor: 1.0; FCC Body 480: ó = 0.98 mho/m år = 56.5 ñ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 02-19-03
Cube 5x5x7: SAR (1g): 4.23 mW/g, SAR (10g): 2.94 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 52.5, 151.5, 3.6
Power Drift: -1.32 dB



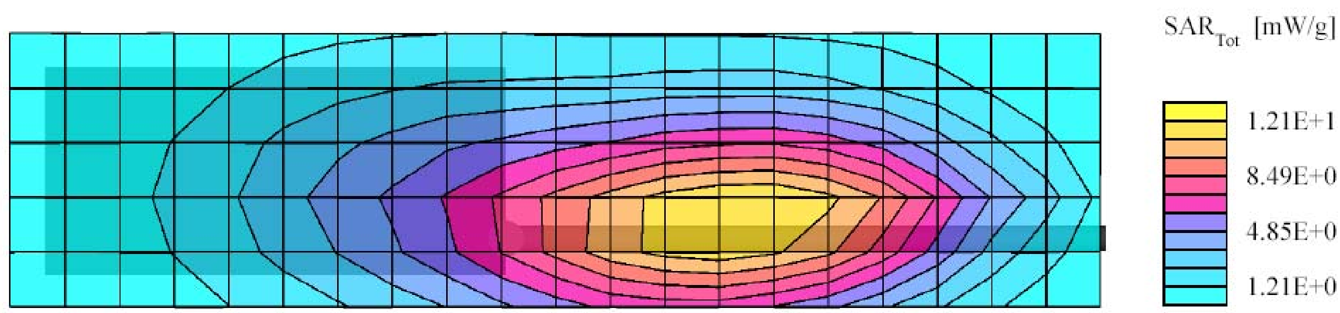


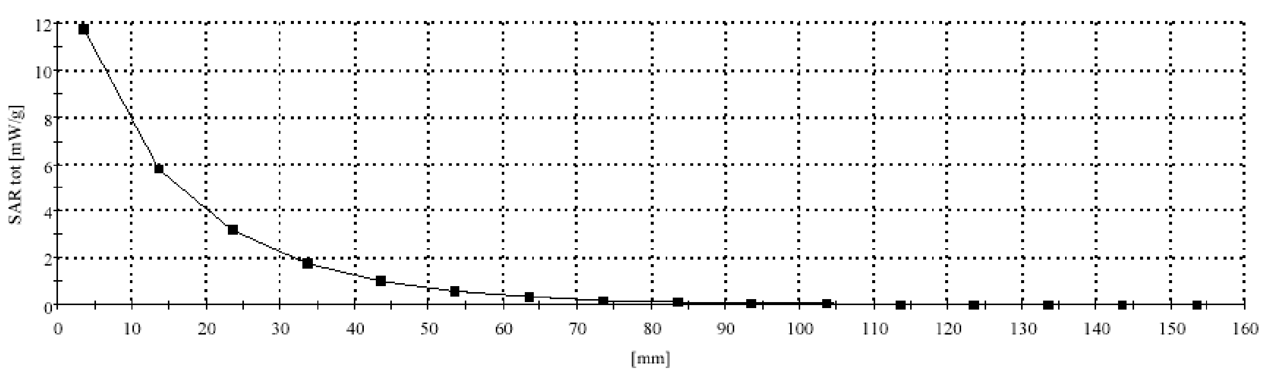
FCC ID: ABZ99FT4058; Test Date: 5/21/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030521-19
MODEL #: AAH50SDC9AA2AN SER #: 032UHF0064
TX FREQ: 495 MHz
SIM TEMP: 20.5 C

ANTENNA KIT #: NAE6483AR
BATTERY KIT #: NNTN4497AR
ACCESSORIES: CHEST PACK #: HLN6602A
AUDIO ACCESSORIES: Ear piece #: HMN9754D

DUT w/ chest pack against the phantom
Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1393; ConvF(8.00,8.00,8.00); Probe cal date: 16/04/03; Crest factor: 1.0; FCC Body 480: σ = 0.98 mho/m ε = 56.5 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 02-19-03
Cube 5x5x7: SAR (1g): 11.1 mW/g, SAR (10g): 7.66 mW/g * Max outside, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 51.0, 201.0, 3.6
Power Drift: -0.91 dB

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.

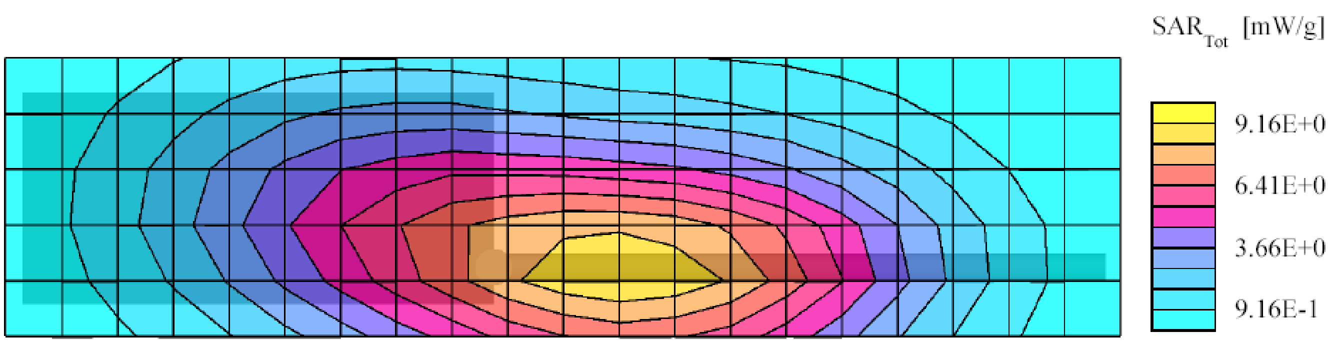


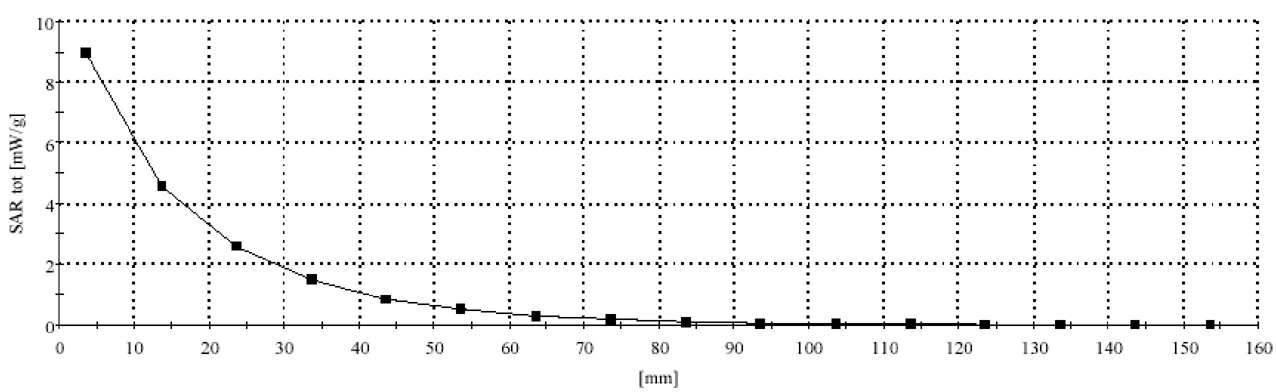


FCC ID: ABZ99FT4058; Test Date: 5/23/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030523-05
MODEL #: AAH50SDC9AA2AN SER #: 032UHF0064
TX FREQ: 495 MHz
SIM TEMP: 21.0 C

ANTENNA KIT #: NAE6483AR
BATTERY KIT #: NNTN4497AR
ACCESSORIES: None; unit back with antenna @ 2.5 cm
AUDIO ACCESSORIES: 2- piece Surveillance #: HMN9754D

DUT back towards phantom w/ antenna separated 2.5 cm
Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1393; ConvF(8.00,8.00,8.00); Probe cal date: 16/04/03; Crest factor: 1.0; FCC Body 480: σ = 0.94 mho/m ε = 54.1 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 02-19-03
Cube 5x5x7: SAR (1g): 8.27 mW/g, SAR (10g): 5.86 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 57.0, 165.0, 3.6
Power Drift: -0.40 dB

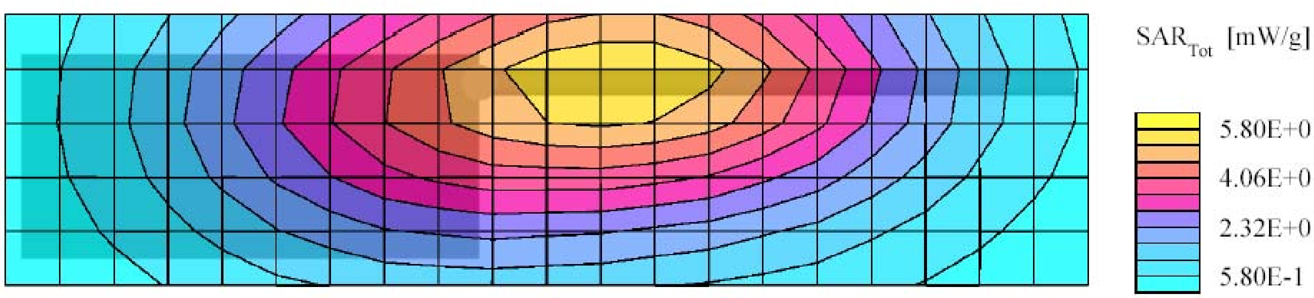


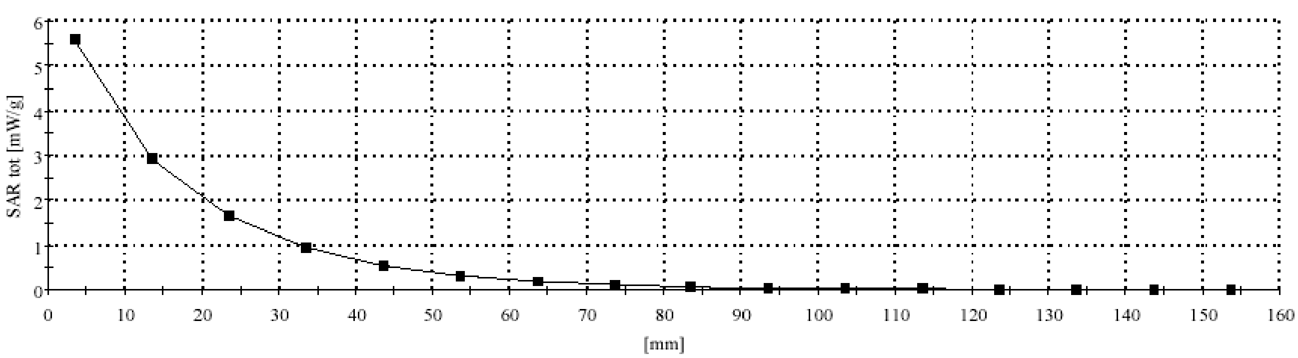


FCC ID: ABZ99FT4058; Test Date: 5/23/03
Motorola CGISS EME Laboratory
RUN #: Face-R3-030523-13
MODEL #: AAH50SDC9AA2AN SER #: 032UHF0064
TX FREQ: 495 MHz
SIM TEMP: 20.5 C

ANTENNA KIT #: NAE6483AR
BATTERY KIT #: NNTN4497AR
ACCESSORIES: NONE
AUDIO ACCESSORIES: NONE

DUT w/ front towards phantom w/ 2.5 cm separation.
Flat Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1393; ConvF(8.10,8.10,8.10); Probe cal date: 16/04/03; Crest factor: 1.0; IEEE Head 480 MHz: σ = 0.90 mho/m ε = 43.9 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 02-19-03
Cube 5x5x7: SAR (1g): 5.23 mW/g, SAR (10g): 3.76 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 16.5, 171.0, 3.6
Power drift: -0.50 dB

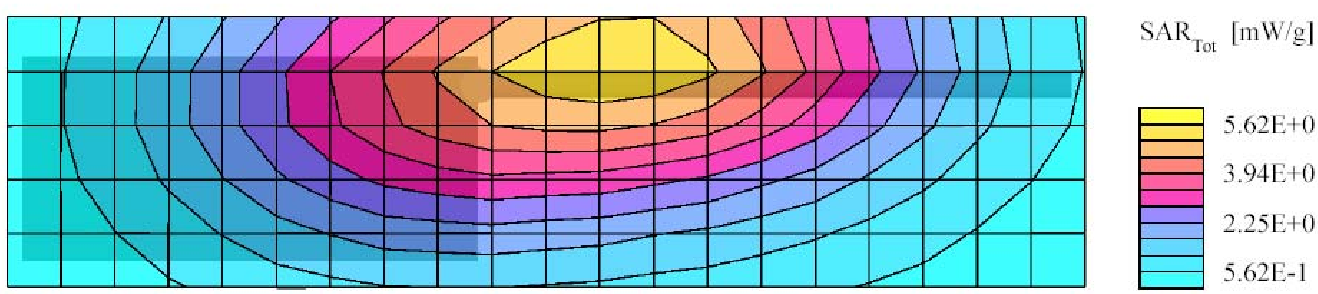


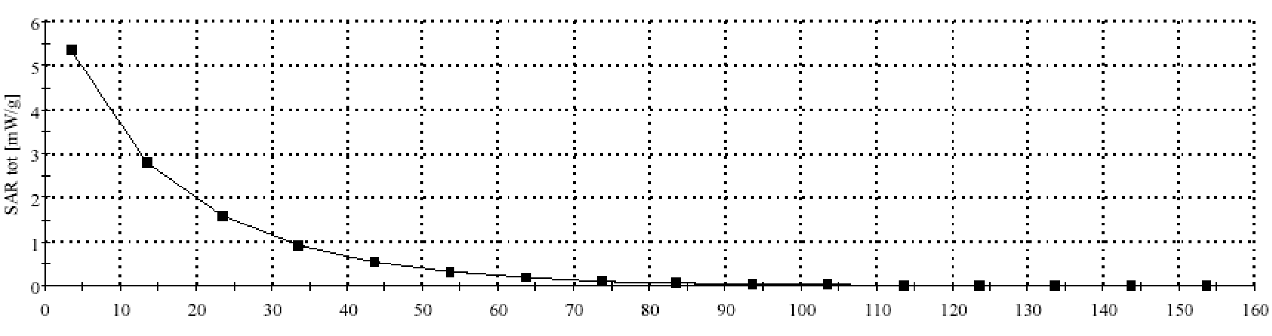


FCC ID: ABZ99FT4058; Test Date: 5/23/03
Motorola CGISS EME Laboratory
RUN #: Face-R3-030523-14
MODEL #: AAH50SDC9AA2AN SER #: 032UHF0064
TX FREQ: 495 MHz
SIM TEMP: 20.5 C

ANTENNA KIT #: NAE6483AR
BATTERY KIT #: NNTN4497AR
ACCESSORIES: NONE
AUDIO ACCESSORIES: Earpiece #: HMN9752B

DUT w/ front towards phantom w/ 2.5 cm separation (attached audio acc.)
Flat Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1393; ConvF(8.10,8.10,8.10); Probe cal date: 16/04/03; Crest factor: 1.0; IEEE Head 480 MHz: σ = 0.90 mho/m ε = 43.9 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 02-19-03
Cube 5x5x7: SAR (1g): 5.00 mW/g, SAR (10g): 3.60 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 12.0, 169.5, 3.6
Power Drift: -0.52 dB





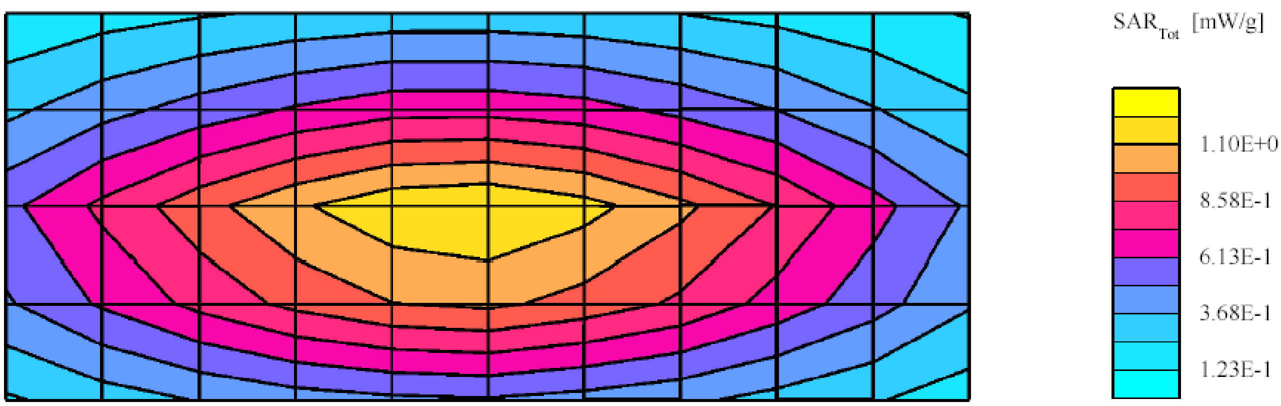
APPENDIX C

Dipole System Performance Check Results

SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date: 5/19/03
Motorola CGISS EME Lab
Run #: Sys Perf-R3-030519-02
TX Freq: 450 MHz
Sim Tissue Temp: 20.8 (Celsius)
Start Power; 250mW

Target at 1W is 4.52 mW/g (1g) and 2.99 mW/g (10g avg.)
SAR calculated 1g is 4.60 mW/g percent from target (including drift) + 1.77%
SAR Calculated 10g is 3.08 mW/g Percent from target (including drift) is + 2.88 %

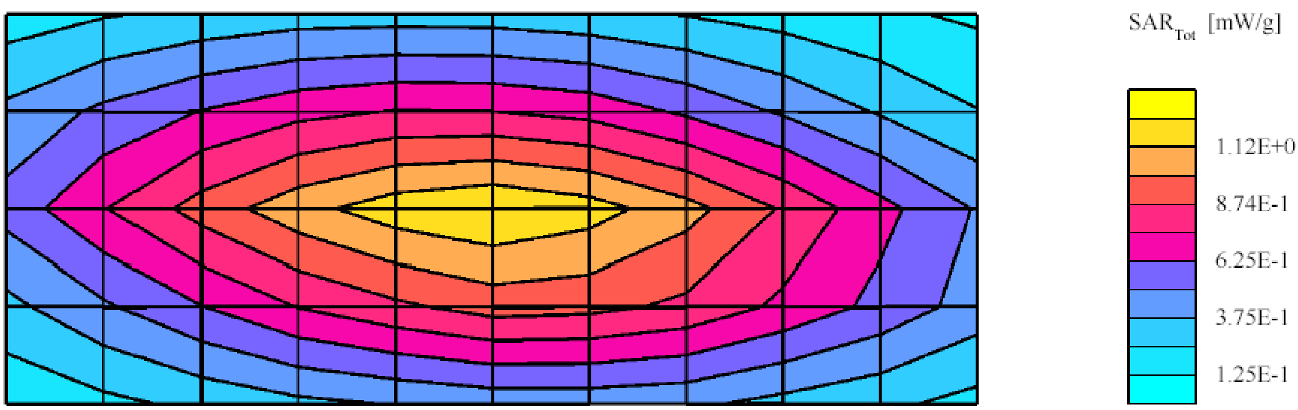
Flat Phantom; Probe: ET3DV6 - SN1393;Probe Cal Date: 16/04/03ConvF(8.00,8.00,8.00); Crest factor: 1.0; FCC Body 450: σ = 0.96 mho/m ε = 56.8 ρ = 1.00 g/cm3; DAE3: SN:374 DAE Cal Date: 02/19/03
Cubes (3): Peak: 1.20 mW/g ± 23.27 dB, SAR (1g): 0.769 mW/g ± 0.00 dB, SAR (10g): 0.512 mW/g ± 0.00 dB, (Worst-case extrapolation) Penetration depth: 13.1 (11.3, 15.2) [mm]
Power drift: -0.00 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date: 5/20/03
Motorola CGISS EME Lab
Run #: Sys Perf-R3-030520-01
TX Freq: 450 MHz
Sim Tissue Temp: 21.2 (Celsius)
Start Power; 250mW

Target at 1W is 4.52 mW/g (1g) and 2.99 mW/g (10g avg.)
SAR calculated 1g is 4.45 mW/g percent from target (including drift) -1.46%
SAR Calculated 10g is 0.758 mW/g Percent from target (including drift) is -1.81%

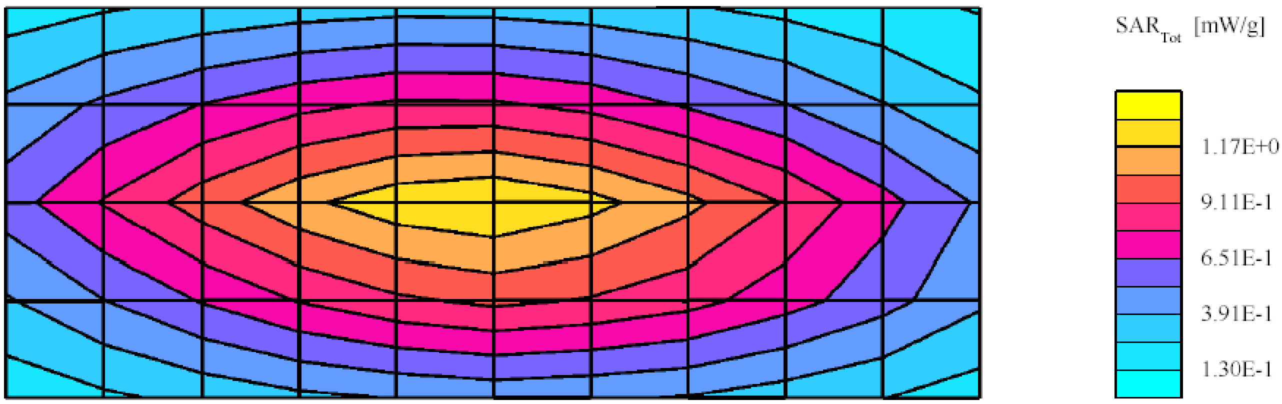
Flat Phantom; Probe: ET3DV6 - SN1393;Probe Cal Date: 16/04/03ConvF(8.00,8.00,8.00); Crest factor: 1.0; FCC Body 450: σ = 0.95 mho/m ε = 56.8 ρ = 1.00 g/cm3; DAE3: SN:374 DAE Cal Date: 02/19/03
Cubes (3): Peak: 1.82 mW/g ± 0.10 dB, SAR (1g): 0.765 mW/g ± 0.00 dB, SAR (10g): 0.505 mW/g ± 0.00 dB, (Worst-case extrapolation) Penetration depth: 12.7 (11.0, 14.8) [mm]
Power drift: 0.14 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date: 5/21/03
Motorola CGISS EME Lab
Run #: Sys Perf-R3-030521-01
TX Freq: 450 MHz
Sim Tissue Temp: 21.1 (Celsius)
Start Power; 250mW

Target at 1W is 4.52 mW/g (1g) and 2.99 mW/g (10g avg.)
SAR calculated 1g is 4.77 mW/g percent from target (including drift) is 5.63%
SAR Calculated 10g is 3.17 mW/g Percent from target (including drift) is 6.10%

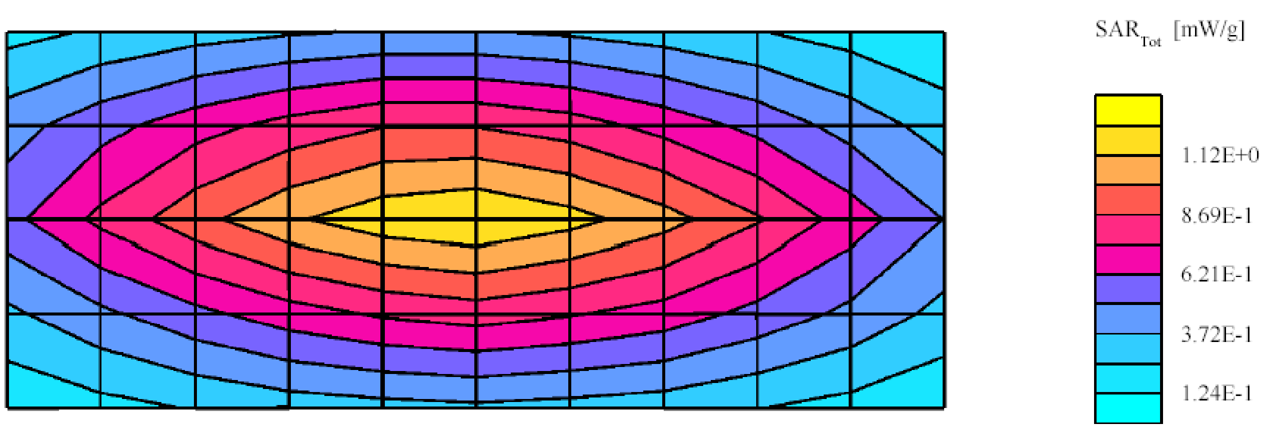
Flat Phantom; Probe: ET3DV6 - SN1393;Probe Cal Date: 16/04/03ConvF(8.00,8.00,8.00); Crest factor: 1.0; FCC Body 450: σ = 0.95 mho/m ε = 56.9 ρ = 1.00 g/cm3; DAE3: SN:374 DAE Cal Date: 02/19/03
Cubes (3): Peak: 1.23 mW/g ± 20.39 dB, SAR (1g): 0.787 mW/g ± 0.00 dB, SAR (10g): 0.523 mW/g ± 0.00 dB, (Worst-case extrapolation) Penetration depth: 12.9 (11.2, 15.1) [mm]
Power drift: -0.05 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date: 5/22/03
Motorola CGISS EME Lab
Run #: Sys Perf-R3-030522-01
TX Freq: 450 MHz
Sim Tissue Temp: 20.7 (Celsius)
Start Power; 250mW

Target at 1W is 4.52 mW/g (1g) and 2.99 mW/g (10g avg.)
SAR calculated 1g is 4.52 mW/g percent from target (including drift) is 0%
SAR Calculated 10g is 3.01 mW/g Percent from target (including drift) is 0.7%

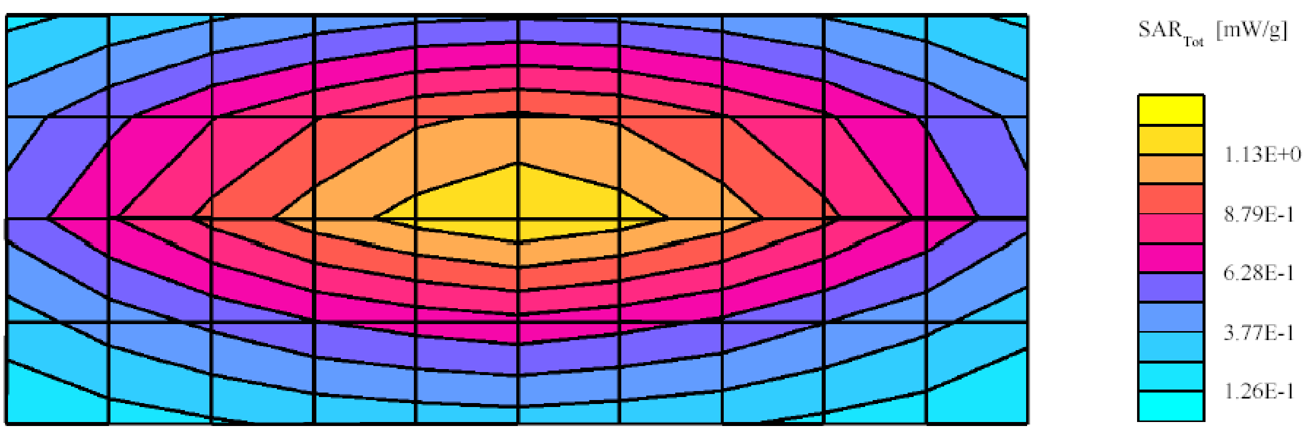
Flat Phantom; Probe: ET3DV6 - SN1393;Probe Cal Date: 16/04/03ConvF(8.00,8.00,8.00); Crest factor: 1.0; FCC Body 450: σ = 0.92 mho/m ε = 56.1 ρ = 1.00 g/cm3; DAE3: SN:374 DAE Cal Date: 02/19/03Cubes (2): Peak: 1.76 mW/g ± 0.02 dB, SAR (1g): 1.13 mW/g ± 0.03 dB, SAR (10g): 0.753 mW/g ± 0.04 dB, (Worst-case extrapolation)
Penetration depth: 12.9 (11.2, 15.1) [mm]
Power drift: -0.00 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date: 5/23/03
Motorola CGISS EME Lab
Run #: Sys Perf-R3-030523-07
TX Freq: 450 MHz
Sim Tissue Temp: 20.3 (Celsius)
Start Power; 250mW

Target at 1W is 4.7 mW/g (1g) and 3.11 mW/g (10g avg.)
SAR calculated 1g is 4.68 mW/g percent from target (including drift) is -0.4%
SAR Calculated 10g is 3.10 mW/g Percent from target (including drift) is -0.3%

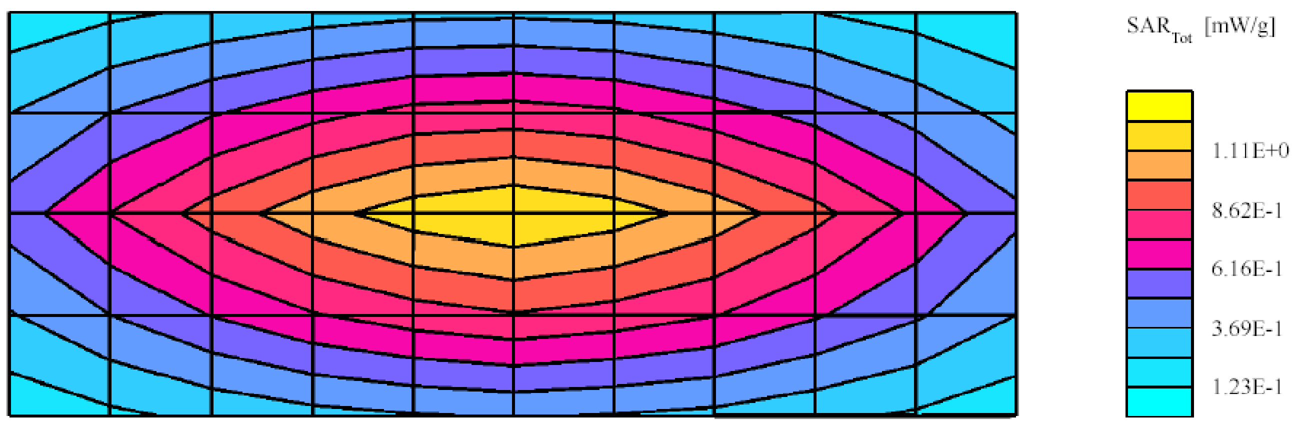
Flat Phantom; Probe: ET3DV6 - SN1393;Probe Cal Date: 16/04/03ConvF(8.10,8.10,8.10); Crest factor: 1.0; IEEE Head 450 MHz: σ = 0.88 mho/m ε = 44.6 ρ = 1.00 g/cm3; DAE3: SN:374 DAE Cal Date: 02/19/03
Cubes (2): Peak: 1.84 mW/g ± 0.05 dB, SAR (1g): 1.17 mW/g ± 0.05 dB, SAR (10g): 0.775 mW/g ± 0.05 dB, (Worst-case extrapolation) Penetration depth: 12.7 (11.0, 14.8) [mm]
Power drift: 0.00 dB



SPEAG 450 MHz Dipole D450V2; SN-1002; Test Date: 5/23/03
Motorola CGISS EME Lab
Run #: Sys Perf-R3-030523-01
TX Freq: 450 MHz
Sim Tissue Temp: 21.1 (Celsius)
Start Power; 250mW

Target at 1W is 4.52 mW/g (1g) and 2.99 mW/g (10g avg.)
SAR calculated 1g is 4.45 mW/g percent from target (including drift) is -1.5%
SAR Calculated 10g is 2.97 mW/g Percent from target (including drift) is -.5%

Flat Phantom; Probe: ET3DV6 - SN1393;Probe Cal Date: 16/04/03ConvF(8.00,8.00,8.00); Crest factor: 1.0; FCC Body 450: $\sigma = 0.91$ mho/m $\varepsilon = 54.6$ $\rho = 1.00$ g/cm3; DAE3: SN:374 DAE Cal Date: 02/19/03
Cubes (2): Peak: 1.73 mW/g ± 0.05 dB, SAR (1g): 1.11 mW/g ± 0.04 dB, SAR (10g): 0.742 mW/g ± 0.04 dB, (Worst-case extrapolation) Penetration depth: 12.9 (11.3, 15.0) [mm]
Power drift: -0.01 dB



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: (normalized to 1.0 W, including drift)	4.52 mW/g,	2.99 mW/g (10g avg.)

Test performed by: J. Fortier Initial:

Sys. Per. Chk. Form: 021024

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

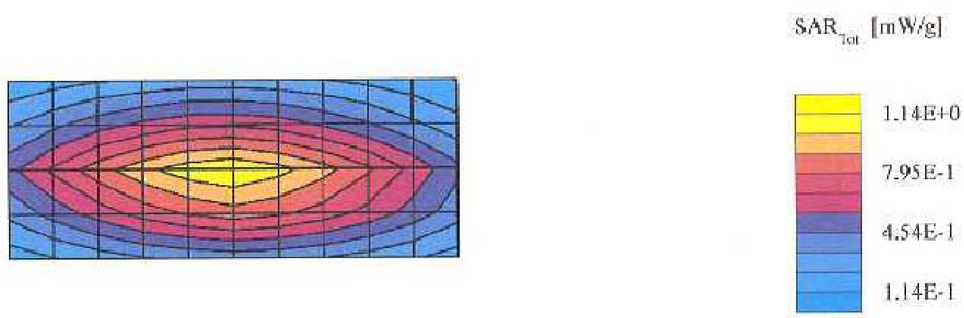
Run #: Sys Val_R3_030116-07
Model #: D450V2
Robot: CGISS-3
TX Freq: 450 MHz
Start Power; 250mW
DAE3: SN:406

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: $\sigma = 0.92$ mho/m $\varepsilon_r = 55.4$ $\rho = 1.00$ 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



Motorola CGISS EME Lab

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: 4.70 mW/g, 3.11 mW/g (10g avg.)
(normalized to 1.0 W, including drift)

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

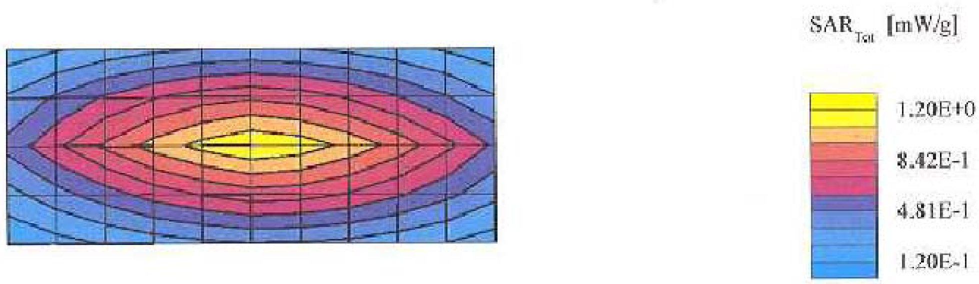
Phantom #:80302002B/S6
SN: 1002
Tester: J. Fortier
Sim Tissue Temp: 21.2 (Celsius)

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

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

Client **Motorola CGISS**

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1393
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	April 16, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date	Scheduled Calibration
RF generator HP 8684C	US3642U01700	4-Aug-99 (in house check Aug-02)	In house check: Aug-05
Power sensor E4412A	MY41495277	2-Apr-03	Apr-04
Power sensor HP 8481A	MY41092180	18-Sep-02	Sep-03
Power meter EPM E4419B	GB41293874	13-Sep-02	Sep-03
Network Analyzer HP 8753E	US38432426	3-May-00	In house check: May 03
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01	Sep-03

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	D. Vetter
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: April 16, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

DASY - Parameters of Probe: ET3DV6 SN:1393

Sensitivity in Free Space

NormX	1.80 $\mu V/(V/m)^2$
NormY	1.49 $\mu V/(V/m)^2$
NormZ	1.80 $\mu V/(V/m)^2$

Diode Compression

DCP X	94	mV
DCP Y	94	mV
DCP Z	94	mV

Sensitivity in Tissue Simulating Liquid

Head **900 MHz** ε_r **= 41.5 ± 5%** σ **= 0.97 ± 5% mho/m**

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to IEEE P1528-200X

ConvF X	**7.0** ± 9.5% (k=2)		Boundary effect:	
ConvF Y	**7.0** ± 9.5% (k=2)		Alpha	**0.31**
ConvF Z	**7.0** ± 9.5% (k=2)		Depth	**2.71**

Head **1800 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to IEEE P1528-200X

ConvF X	**5.5** ± 9.5% (k=2)		Boundary effect:	
ConvF Y	**5.5** ± 9.5% (k=2)		Alpha	**0.48**
ConvF Z	**5.5** ± 9.5% (k=2)		Depth	**2.51**

Boundary Effect

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

Probe Tip to Boundary	**1 mm**	**2 mm**
SAR_{be} [%] Without Correction Algorithm	9.0	5.3
SAR_{be} [%] With Correction Algorithm	0.3	0.5

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

Probe Tip to Boundary	**1 mm**	**2 mm**
SAR_{be} [%] Without Correction Algorithm	12.2	8.3
SAR_{be} [%] With Correction Algorithm	0.1	0.3

Sensor Offset

Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**0.9 ± 0.2**	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:	**ET3DV6**
Serial Number:	**1393**
Place of Assessment:	**Zurich**
Date of Assessment:	**April 21, 2003**
Probe Calibration Date:	**April 16, 2003**

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 ET3DV6 SN:1393

Conversion factor (± standard deviation)

150 MHz	ConvF	**8.8 ± 8%**	ε_r = 61.9 σ = 0.80 mho/m (body tissue)
236 MHz	ConvF	**8.6 ± 8%**	**ε_r = 59.8** **σ = 0.87 mho/m** **(body tissue)**
300 MHz	ConvF	**8.4 ± 8%**	**ε_r = 58.2** **σ = 0.92 mho/m** **(body tissue)**
350 MHz	ConvF	**8.4 ± 8%**	**ε_r = 57.7** **σ = 0.93 mho/m** **(body tissue)**
450 MHz	ConvF	**8.0 ± 8%**	ε_r = 56.7 σ = 0.94 mho/m (body tissue)
784 MHz	ConvF	**7.0 ± 8%**	ε_r = 55.4 σ = 0.97 mho/m (body tissue)
1450 MHz	ConvF	**5.6 ± 8%**	ε_r = 54.0 σ = 1.30 mho/m (body tissue)

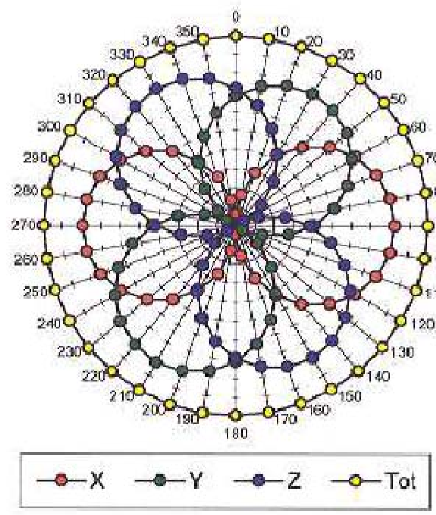
Dosimetric E-Field Probe ET3DV6 SN:1393

Conversion factor (± standard deviation)

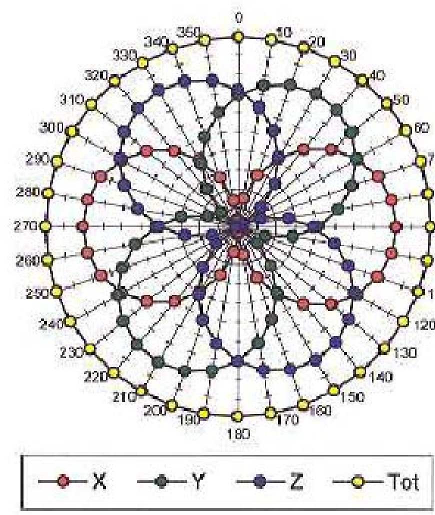
150 MHz	ConvF	**9.7 ± 8%**	ε_r = 52.3 σ = 0.76 mho/m (head tissue)
236 MHz	ConvF	**8.8 ± 8%**	ε_r = 48.3 σ = 0.82 mho/m (head tissue)
300 MHz	ConvF	**8.5 ± 8%**	ε_r = 45.3 σ = 0.87 mho/m (head tissue)
350 MHz	ConvF	**8.5 ± 8%**	ε_r = 44.7 σ = 0.87 mho/m (head tissue)
400 MHz	ConvF	**8.1 ± 8%**	ε_r = 44.4 σ = 0.87 mho/m (head tissue - CENELEC)
450 MHz	ConvF	**8.1 ± 8%**	ε_r = 43.5 σ = 0.87 mho/m (head tissue)
784 MHz	ConvF	**7.3 ± 8%**	ε_r = 41.8 σ = 0.90 mho/m (head tissue)

Receiving Pattern (ϕ, θ = 0°

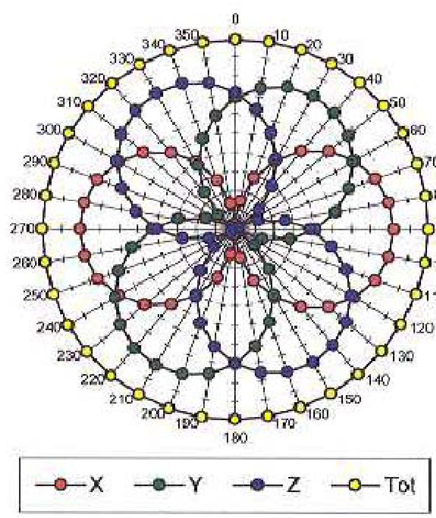
f = 30 MHz, TEM cell ifi110



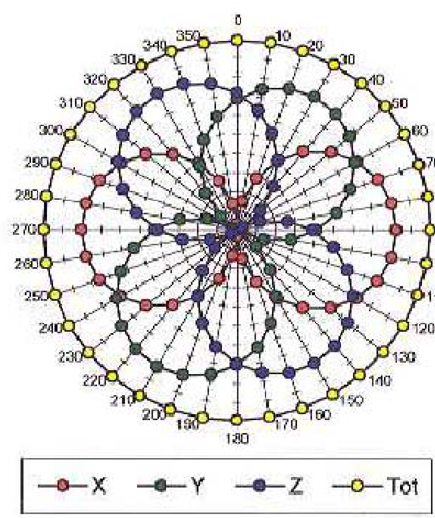
f = 100 MHz, TEM cell ifi110

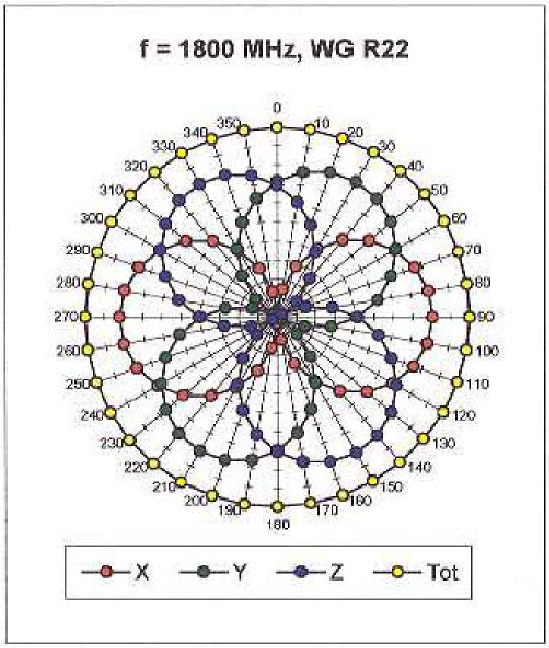


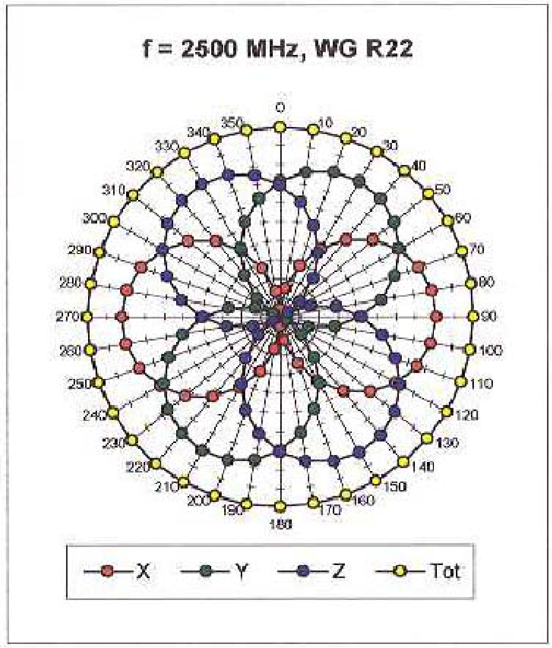
f = 300 MHz, TEM cell ifi110



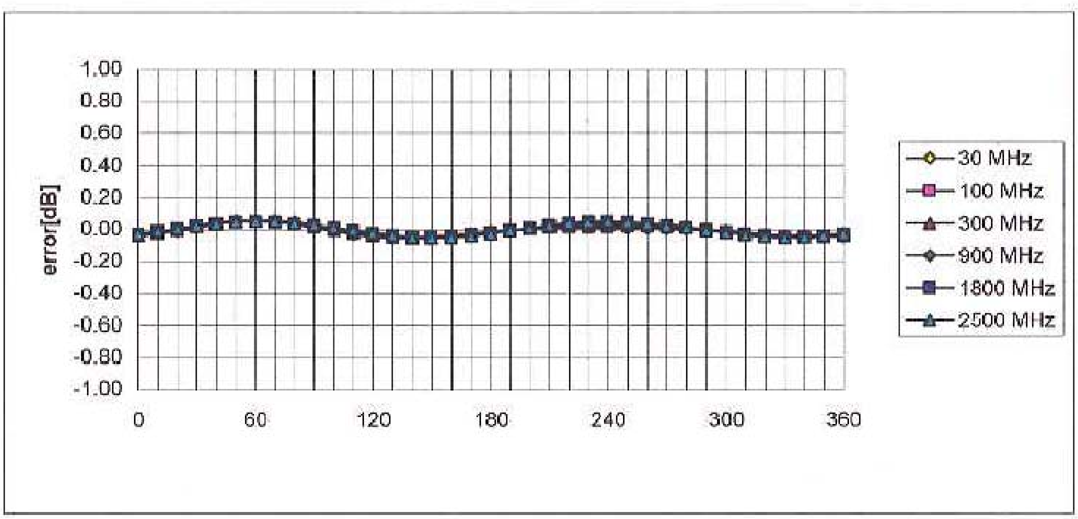
f = 900 MHz, TEM cell ifi110





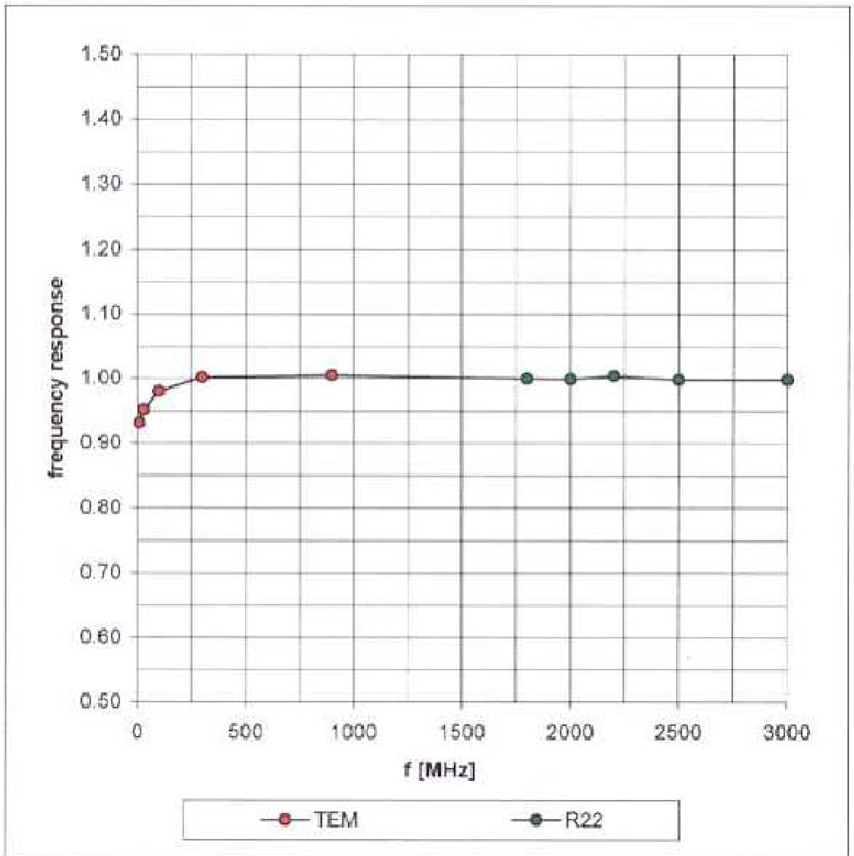


Isotropy Error (ϕ), θ = 0°



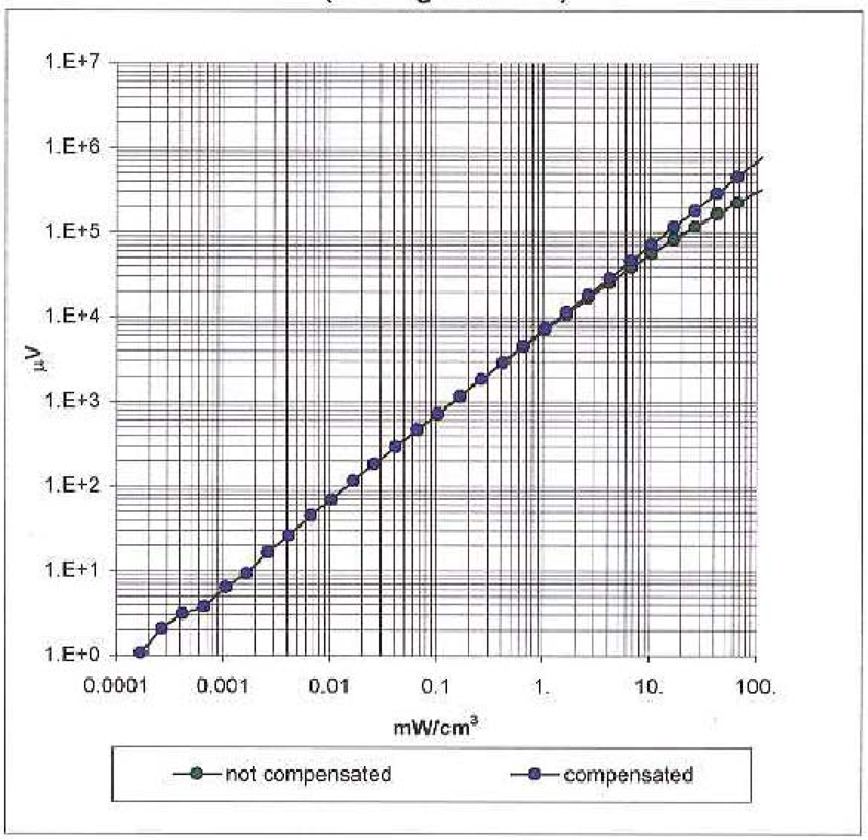
Frequency Response of E-Field

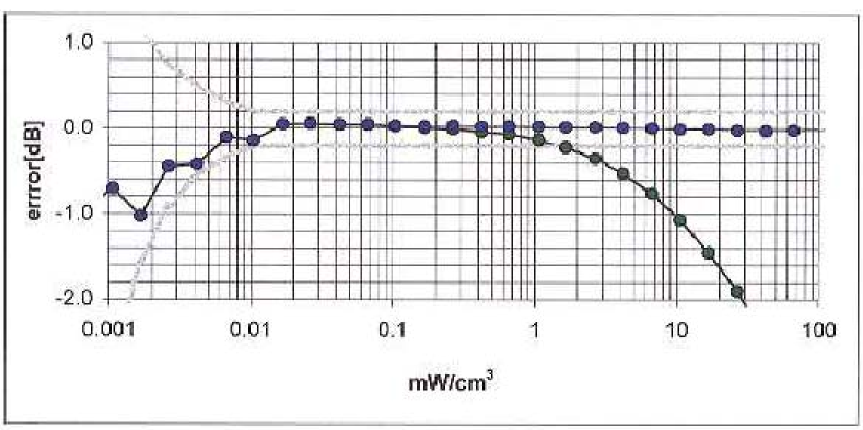
(TEM-Cell:ifi110, Waveguide R22)



Dynamic Range f(SAR_{brain})

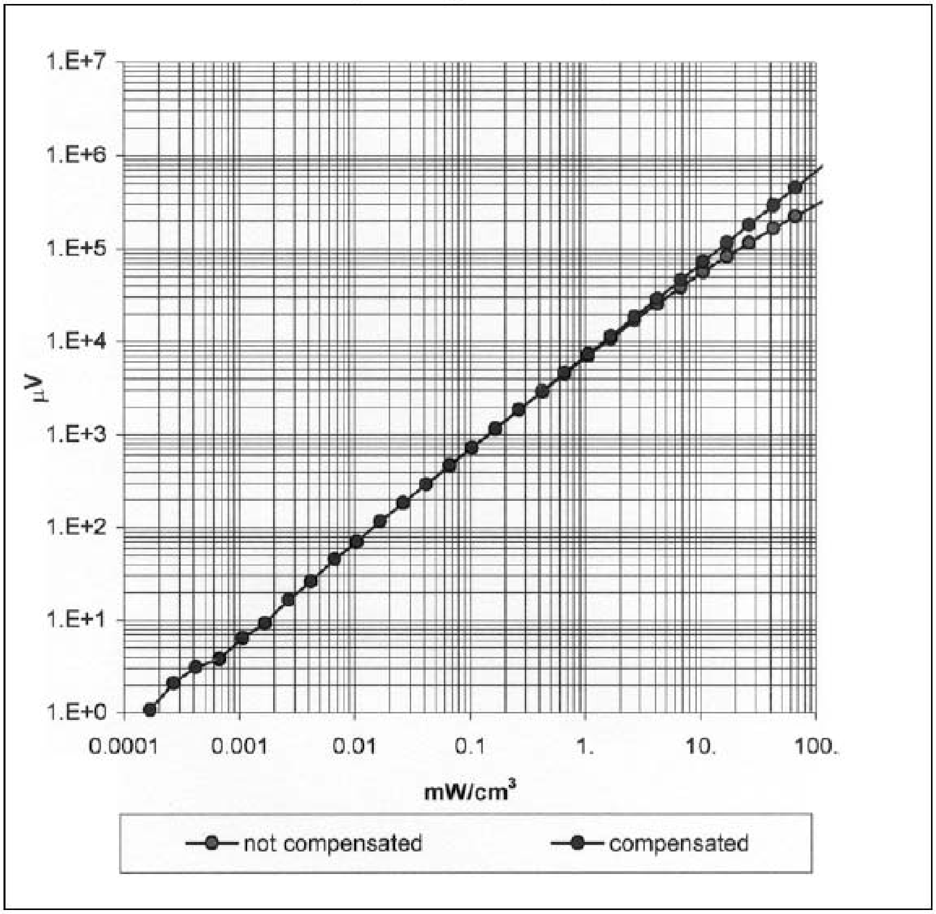
(Waveguide R22)

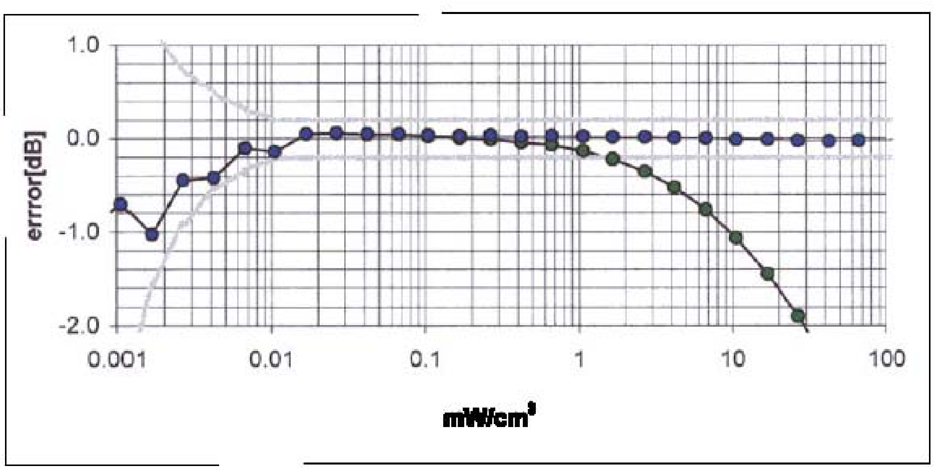




Dynamic Range f(SAR_{brain})

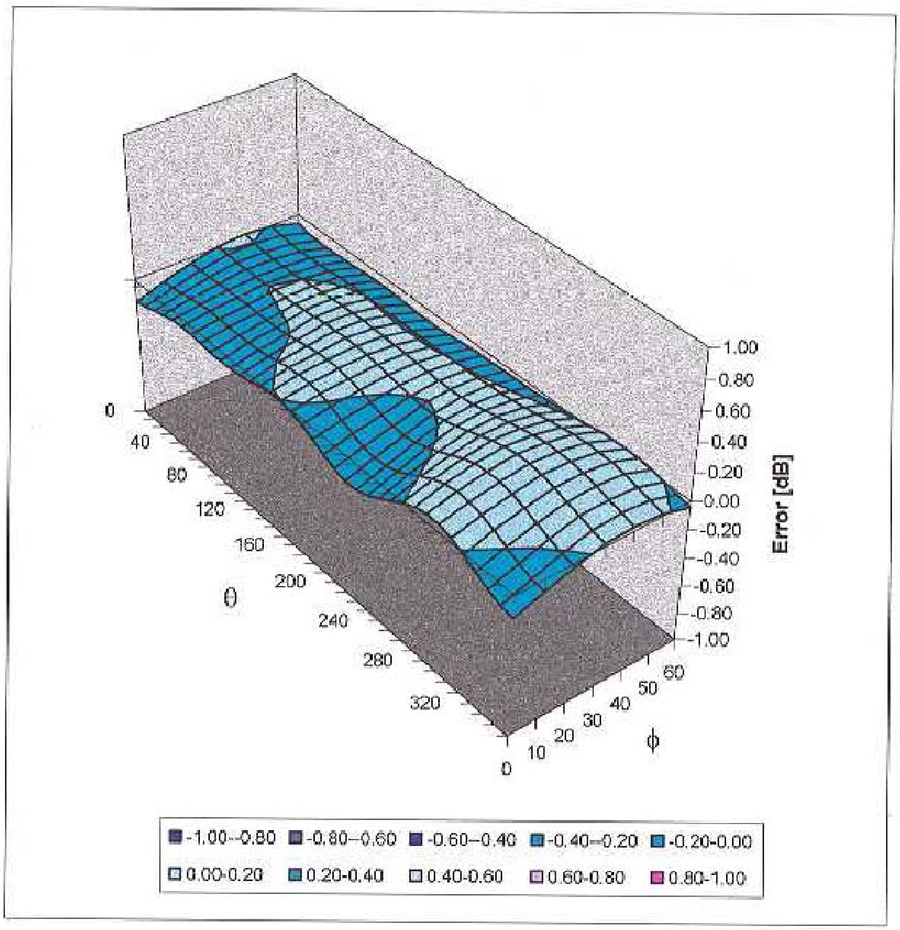
(Waveguide R22)





Deviation from Isotropy in HSL

Error (θφ), f = 900 MHz



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: [signature]

Approved by: [signature]

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.

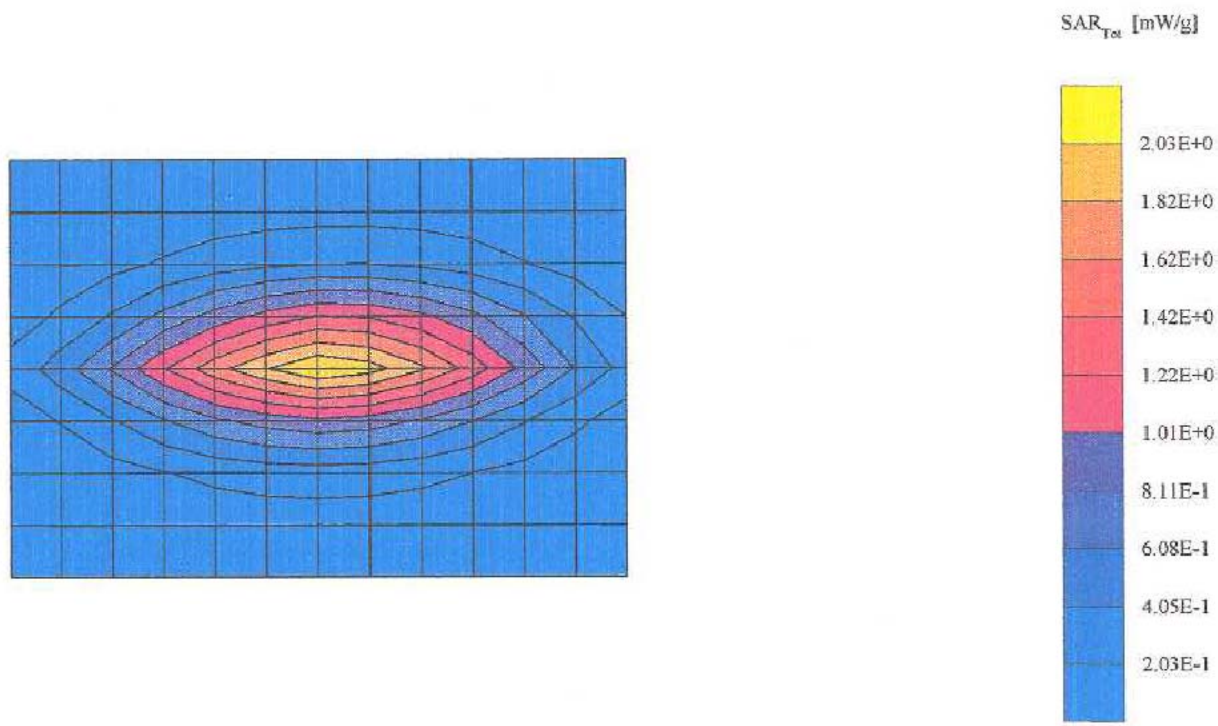
6. Power Test

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

03/27/02

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: σ = 0.86 mho/m ε_r = 44.5 ρ = 1.00 g/cm³
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]



Schmid & Partner Engineering AG, Zurich, Switzerland

APPENDIX E
Illustration of Body-Worn Accessories

The purpose of this appendix is to illustrate the body-worn carry accessories for FCC ID: ABZ99FT4058. 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 HLN9701B
Back View

Photo 4.
Model HLN9701B
Front View

Photo 5.
Model HLN9701B
Side View

Photo 6.
Model RLN5383A
Back View

Photo 7.
Model RLN5383A
Front View

Photo 8.
Model RLN5383A
Side View

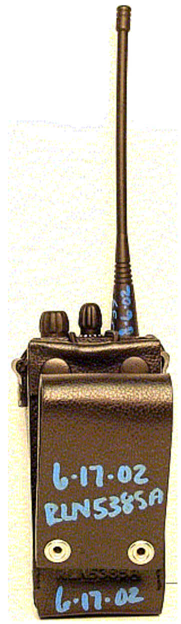


Photo 9.
Model RLN5384A
Back View

Photo 10.
Model RLN5384A
Front View

Photo 11.
Model RLN5384A
Side View

Photo 12.
Model RLN5385A
Back View

Photo 13.
Model RLN5385A
Front View

Photo 14.
Model RLN5385A
Side View

Photo 15.
RLN4815A
Universal Radio Pack

Photo 16.
HLN6602A
Universal Chest Pack

Photo 17.
NTN5243A
Shoulder Carry Strap

Photo 18.
RLN4570A
Break-Away Chest Pack

Photo 19.
4280384F89
Belt lengthener for RLN4815A

Photo 20.
1505596Z02
Replacement strap for HLN6602A Chest

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 ant. and phantom surface. (mm)	Comments
HLN6602A	Yes	7-26	NA
RLN4815A	Yes	43-48	NA
NTN5243A	Yes	NA	Tested with carry case HLN9701B
HLN8255B	Yes	34-39	NA
HLN9701B	Yes	42-49	NA
RLN5383A	Yes	49-59	NA
RLN5385A	Yes	58-70	NA
RLN5384A	No	NA	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
HLN9985B	No	-	Product Not functional while in this carry case
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
HLN9133A	Yes	NA	Tested w/ HMN9013A
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
PMMN4008A	Yes	NA	NA
PMLN4425A	Yes	NA	NA
PMLN4443A	Yes	NA	NA
PMLN4444A	Yes	NA	NA
PMLN4445A	Yes	NA	NA
PMLN4294C	Yes	NA	NA
PMLN4442A	Yes	NA	NA
BDN6706B	Yes	NA	NA
0180300E83	Yes	NA	Tested w/ BDN6706B

RMN4054B	Yes	NA	NA
RMN4055A	Yes	NA	NA
RMN4051B	Yes	NA	NA
RKN4094A	Yes	NA	Tested w/ RMN4051B
HMN9727B	Yes	NA	NA
HMN9752B	Yes	NA	NA
RLN4894A	No	NA	Similar to HMN9727B
RMN4052A	No	NA	Similar to RMN4051B
RMN4053A	No	NA	Similar to RMN4051B
BDN6646C	No	NA	Similar to BDN6706B
0180358B38	No	NA	Similar to 0180300E83
RLN4895A	No	NA	Similar to HMN9754D
HMN9036A	No	NA	Similar to HMN9754D
HLN9132A	No	NA	Similar to HMN9727B
RLN5198AP	No	NA	Similar to HMN9754D
BDN6720A	No	NA	Similar to HMN9727B
HMN9022A	No	NA	Similar to HMN9021A