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 3

Date of Report:	November 24, 2003
Report Revision:	Rev. O
Manufacturer:	Motorola
Product Description:	Portable 435-480 MHz, 4W, 32 CH w/ display/Limited Keypad
FCC ID:	**ABZ99FT4065**
Device Model:	PMUE2138A
Test Period:	11/17/03 – 11/20/03
EME Technician:	Clint Miller
Responsible Engineer:	Kim Uong (Sr. EME Engineer)
Author:	Kim Uong (Sr. EME Engineer)
Review By:	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 all applicable national and international reference standards and guidelines.

Deanna Zakharia Signature on File — 11/24/03

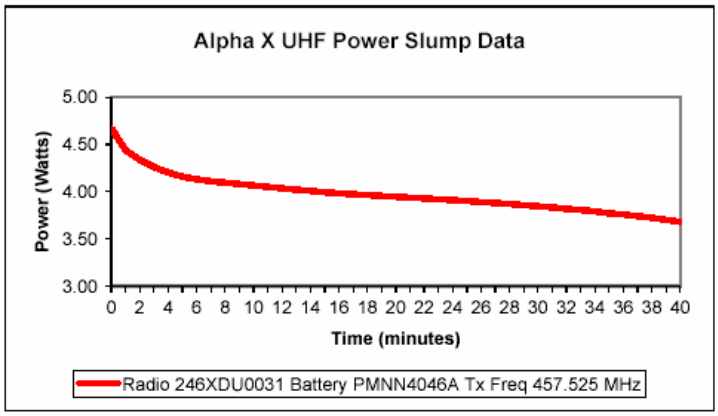
Ken Enger — Date Approved
Senior Resource Manager, Product Safety and EME Director, Phone: 954-723-6299

APPENDIX A

Power Slump Data/Shortened Scan

DUT Power versus time Data

	Radio
	246XDU0031
	Battery PMNN4046A
	Tx Freq 457.525 MHz
Time(Minutes)	Power (watts)
0	4.67
1	4.44
2	4.34
3	4.26
4	4.20
5	4.16
6	4.13
7	4.11
8	4.09
9	4.08
10	4.07
11	4.05
12	4.04
13	4.02
14	4.01
15	4.00
16	3.98
17	3.97
18	3.96
19	3.96
20	3.95
21	3.94
22	3.93
23	3.92
24	3.91
25	3.90
26	3.89
27	3.88
28	3.87
29	3.86
30	3.85
31	3.83
32	3.82
33	3.81
34	3.79
35	3.77
36	3.76
37	3.74
38	3.72
39	3.70
40	3.68



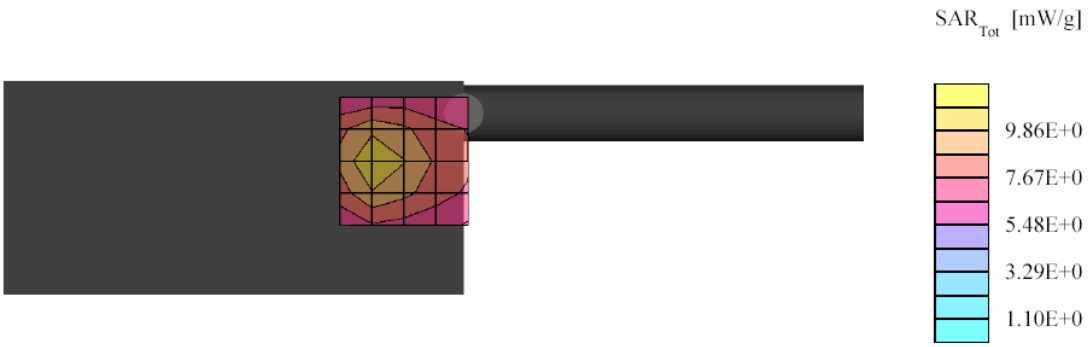
Shortened Scan Results

FCC ID: ABZ99FT4065; Date: 11/20/03
Motorola CGISS EME Laboratory
Run #: KU-R2-031120-05
Model #: PMUE2138A S/N: 246XDU0031
Tx freq: 469.525 MHz
Tissue temp: 20.3 C
Start power: 4.60 W

Antenna #: PMAE4003A
Battery kit: PMNN4046A
Carry Accessories: PMLN4468A
Audio/data accessories: HMN9030A

Shortened scan reflect highest S.A.R producing configuration at the body.
Run time 7minutes
Representative "normal" scan run time was 27 minutes
"Shortened" scan; max. cal. S.A.R. (drift adjusted) w/ 50% duty cycle = 4.27 mW/g
"Normal" scan; max. cal. S.A.R. (drift adjusted) w/ 50% duty cycle = 4.27 mW/g
(See section 7.1 run # KU-R2-031118-09)

DUT with carry holster against the phantom
Flat (2) Phantom; Back of device Section;
Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03;
Crest factor: 1.0;
FCC Body 458: σ = 0.94 mho/m εr = 55.2 ρ = 1.00 g/cm3; DAE: SN401 (08/21/03)
Cube 5x5x7: SAR (1g): 7.05 mW/g, SAR (10g): 4.74 mW/g * Max outside, (Worst-case extrapolation)
Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0;
Power drift: -0.74 dB
Note: "Max outside" has been identified by SPEAG as an unresolved intermittent occurrence with the DASY3 application even when the entire peak area is captured.



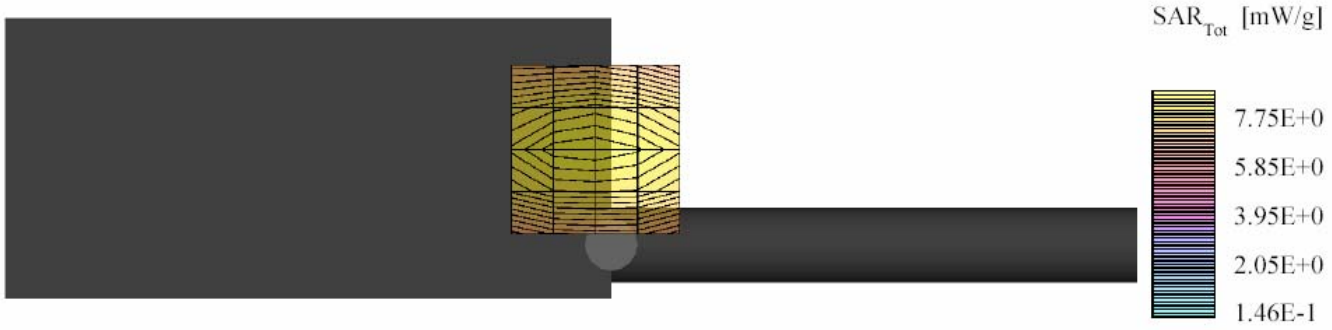
FCC ID: ABZ99FT4065; Date: 11/19/03
Motorola CGISS EME Laboratory

Run #: CM-R2-031119-13
Model #: PMUE2138A S/N: 246XDU0031
Tx freq: 469.525 MHz
Tissue temp: 20.9 C
Start power : 4.55 W

Antenna #: PMAE4003A
Battery kit: PMNN4046A
Carry Accessories: None
Audio/data accessories: None

Shortened scan reflect highest S.A.R producing configuration at the face.
Run time 7minutes
Representative "normal" scan run time was 27 minutes
"Shortened" scan; max. cal. S.A.R. (drift adjusted) w/ 50% duty cycle = 3.74 mW/g
"Normal" scan; max. cal. S.A.R. (drift adjusted) w/ 50% duty cycle = 3.68 mW/g
(See section 7.1 run # KU-R2-031119-05)

Flat Phantom; Flat Abdomen (1) Section;
Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03;Crest factor: 1.0;
IEEE Head 458 MHz: σ = 0.89 mho/m εr = 43.9 ρ = 1.00 g/cm3; DAE: SN401 (08/21/03)
Cube 5x5x7: SAR (1g): 6.03 mW/g, SAR (10g): 4.31 mW/g, (Worst-case extrapolation)
Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0;
Powerdrift: -0.79 dB



APPENDIX B

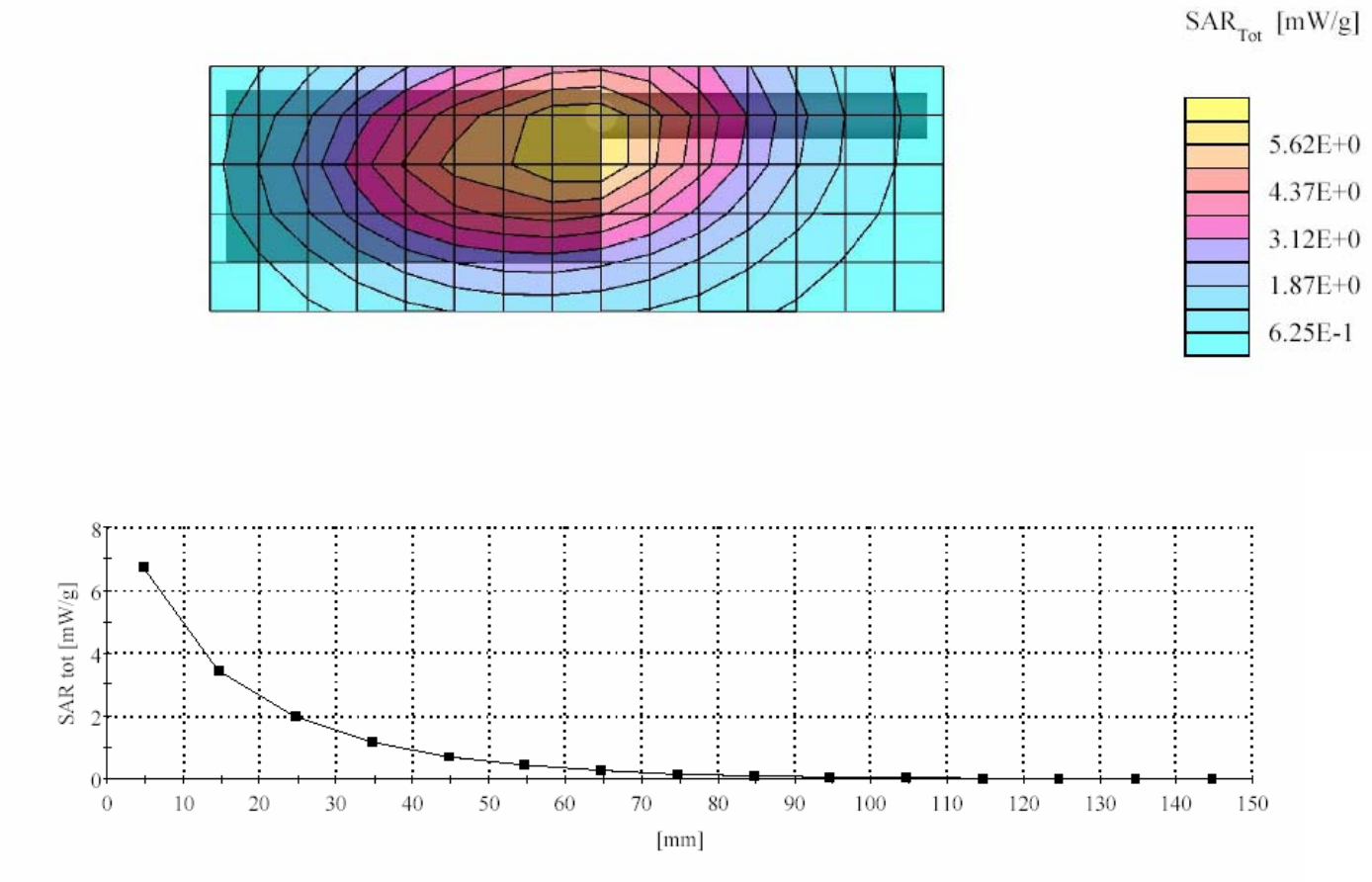
Data Results

FCC ID: ABZ99FT4065; Date: 11/17/03
Motorola CGISS EME Laboratory

Run #: CM-R2-031117-08
Model # PMUE2138A S/N: 246XDU0031
Tx freq: 449.525 MHz
Tissue temp: 20.5 C
Start power : 4.50 W

Antenna #: PMAE4003A
Battery kit: PMNN4046A
Carry Accessories: HLN9844A
Audio/data accessories: HMN9030A

DUT w/ Belt clip against the phantom
Flat (2) Phantom; Back of device Section;
Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0;
FCC Body 458: σ = 0.94 mho/m εr = 54.8 ρ = 1.00 g/cm3 DAE: SN401 (08/21/03)
Cube 7x7x7: SAR (1g): 6.74 mW/g, SAR (10g): 4.68 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 24.0, 114.0, 4.7
Power drift: -0.03 dB

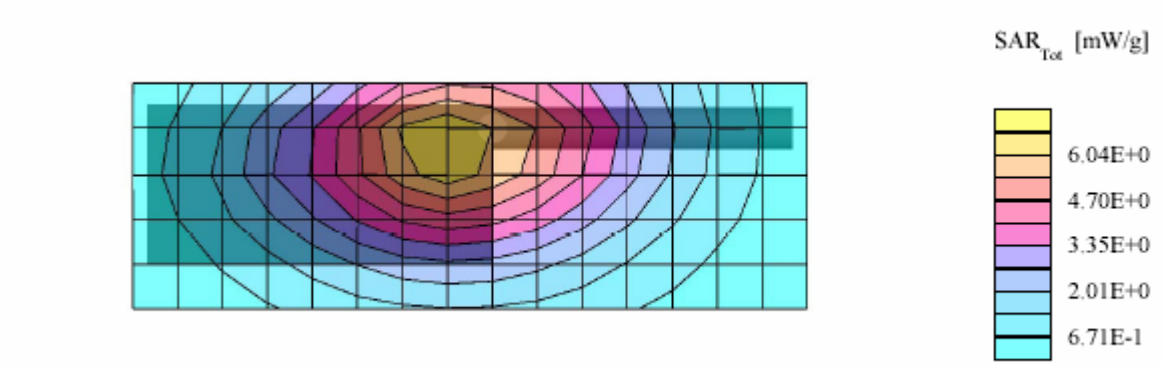


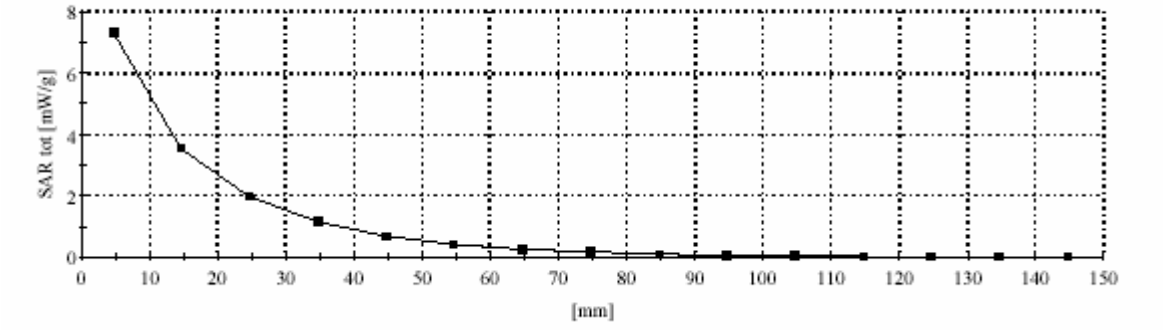
FCC ID: ABZ99FT4065; Date: 11/17/03
Motorola CGISS EME Laboratory

Run #: CM-R2-031117-12
Model #: PMUE2138A S/N: 246XDU0031
Tx freq: 449.525 MHz
Tissue temp: 20.4 C
Start power: 4.55 W

Antenna #: PMAE4003A
Battery kit: PMNN4046A
Carry Accessories: PMLN4468A
Audio/data accessories: HMN9030A

DUT w/ carry holster against the phantom
Flat (2) Phantom; Back of device Section;
Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0;
FCC Body 458: σ = 0.94 mho/m εr = 54.8 ρ = 1.00 g/cm3 DAE: SN401 (08/21/03)
Cube 7x7x7: SAR (1g): 7.24 mW/g, SAR (10g): 4.90 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 21.0, 103.5, 4.7
Power drift: -0.05 dB



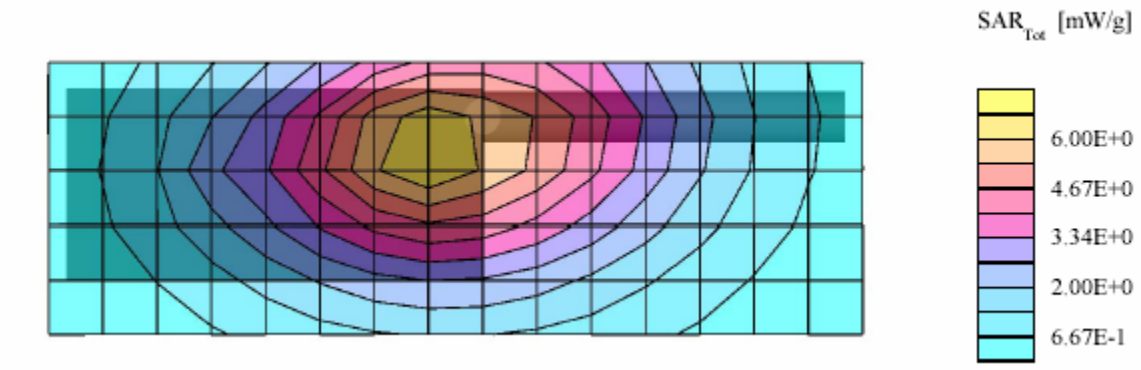


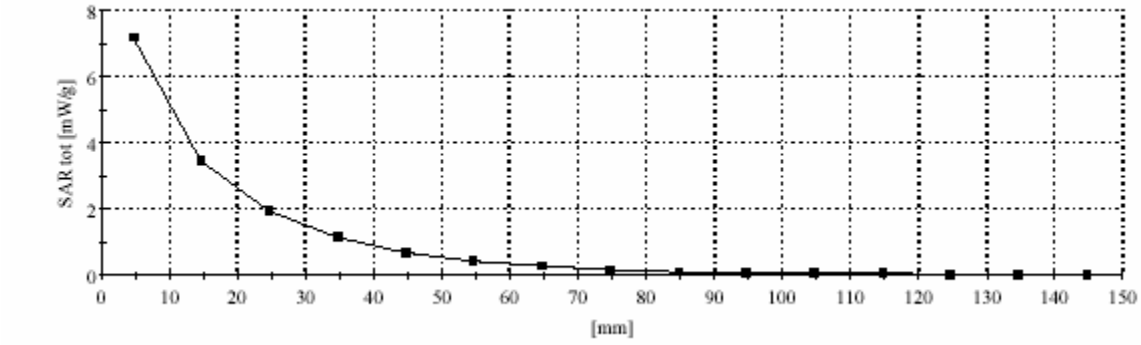
FCC ID: ABZ99FT4065; Date: 11/18/03
Motorola CGISS EME Laboratory

Run #: KU-R2-031118-07
Model # PMUE2138A S/N: 246XDU0031
Tx freq: 449.525 MHz
Tissue temp: 20.6 C
Start power: 4.50 W

Antenna #: PMAE4003A
Battery kit: PMNN4046A
Carry Accessories: PMLN4468A
Audio/data accessories:PMLN4425A

DUT w/ carry holster against the phantom
Flat (2) Phantom; Back of device Section;
Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0;
FCC Body 458: σ = 0.94 mho/m εr = 54.9 ρ = 1.00 g/cm3 DAE: SN401 (08/21/03)
Cube 7x7x7: SAR (1g): 7.09 mW/g, SAR (10g): 4.79 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 24.0, 105.0, 4.7
Power drift: -0.08 dB



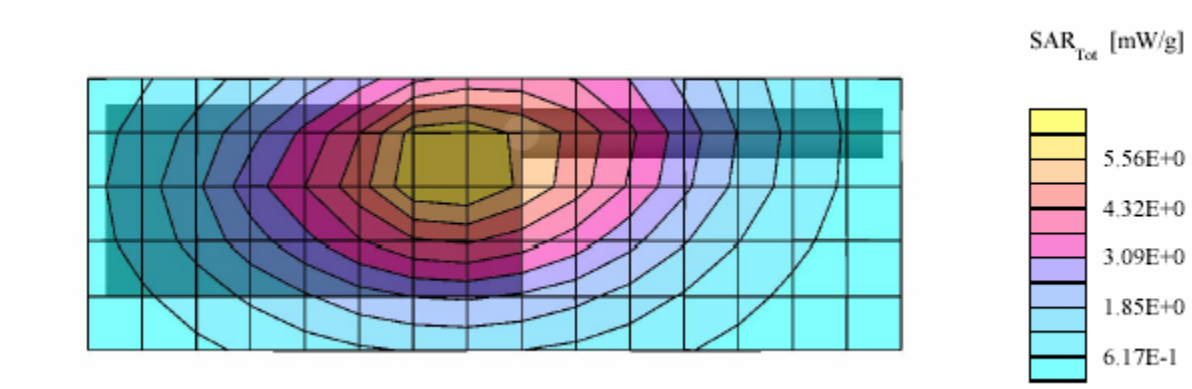


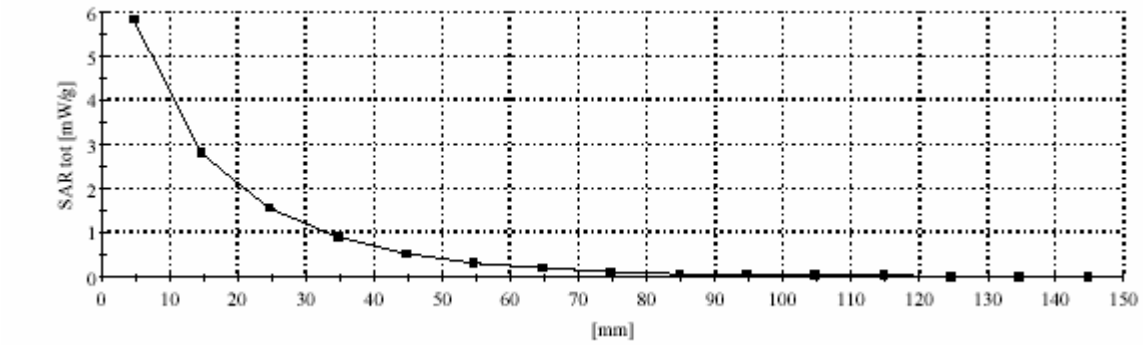
FCC ID: ABZ99FT4065; Date: 11/18/03
Motorola CGISS EME Laboratory

Run #: KU-R2-031118-09
Model # PMUE2138A S/N: 246XDU0031
Tx freq: 469.525 MHz
Tissue temp: 20.5 C
Start power : 4.80 W

Antenna #: PMAE4003A
Battery kit: PMNN4046A
Carry Accessories: PMLN4468A
Audio/data accessories: HMN9030A

DUT w/ carry holster against the phantom
Flat (2) Phantom; Back of device Section;
Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0;
FCC Body 458: σ = 0.94 mho/m εr = 54.9 ρ = 1.00 g/cm3 DAE: SN401 (08/21/03)
Cube 7x7x7: SAR (1g): 6.26 mW/g, SAR (10g): 4.19 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 24.0, 99.0, 4.7
Power drift: -1.35 dB



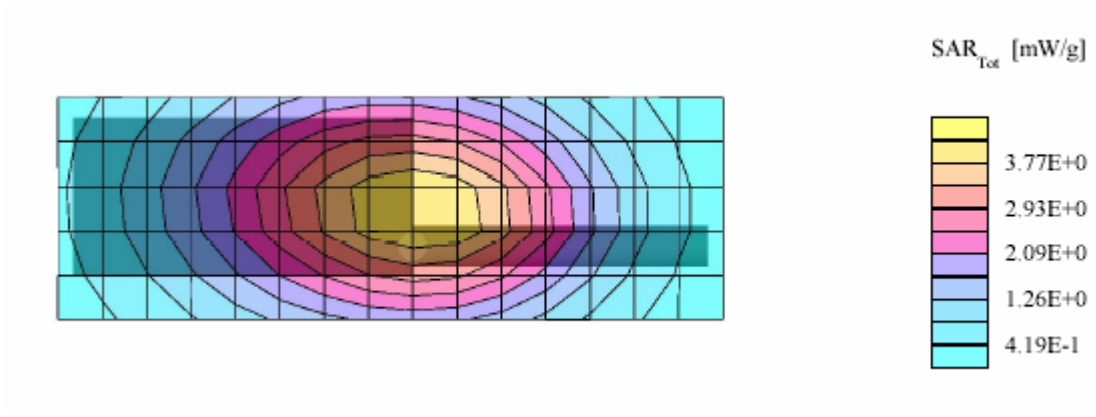


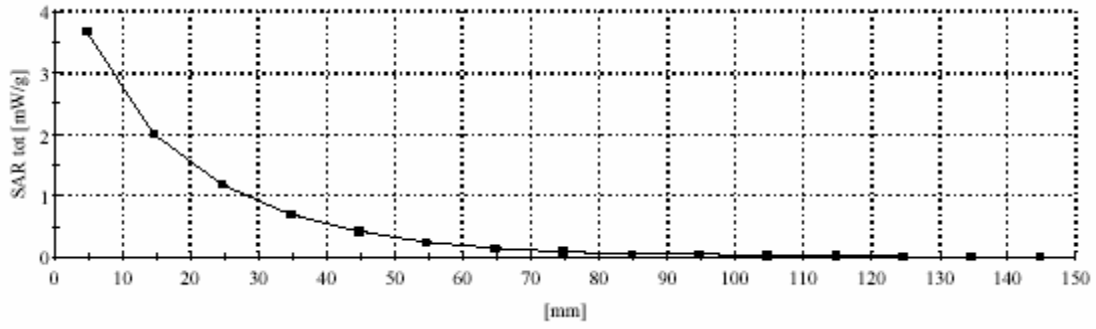
FCC ID: ABZ99FT4065; Date: 11/18/03
Motorola CGISS EME Laboratory

Run #: CM-R2-031118-18
Model # PMUE2138A S/N: 246XDU0031
Tx freq: 469.525 MHz
Tissue temp: 20.7 C
Start power: 4.65 W

Antenna #: PMAE4003A
Battery kit: PMNN4046A
Carry Accessories: NONE
Audio/data accessories: HMN9030A

DUT w/ front separated 2.5cm from phantom
Flat (2) Phantom; Back of device Section;
Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0;
FCC Body 458: σ = 0.94 mho/m εr = 54.9 ρ = 1.00 g/cm3 DAE: SN401 (08/21/03)
Cube 7x7x7: SAR (1g): 4.03 mW/g, SAR (10g): 2.91 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 37.5, 123.0, 4.7
Power drift: -0.83 dB

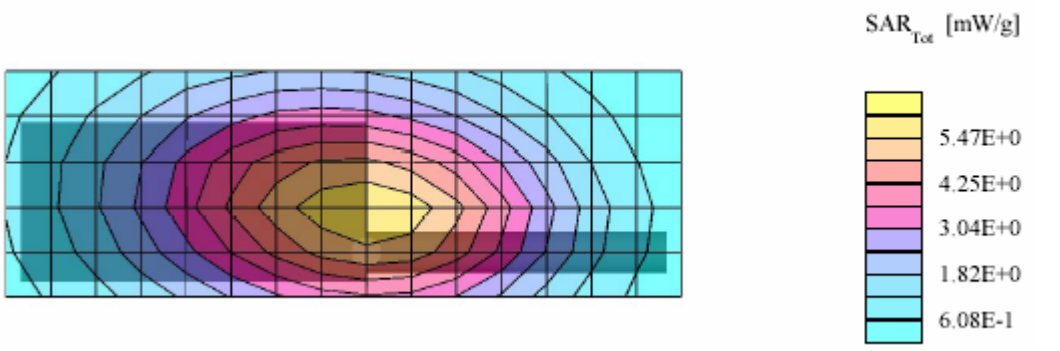


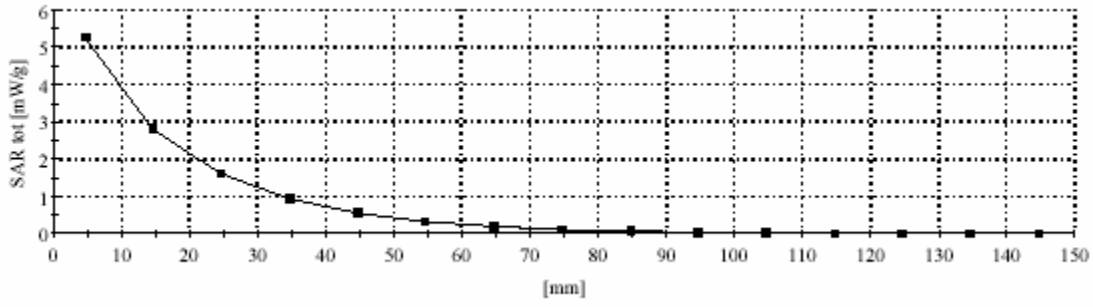


Run #: KU-R2-031119-05
Model # PMUE2138A S/N: 246XDU0031
Tx freq: 469.525 MHz
Tissue temp: 20.6C
Start power: 4.80 W

Antenna #: PMAE4003A
Battery kit: PMNN4046A
Carry Accessories: None
Audio/data accessories: None

DUT w/ front separated 2.5cm from phantom
Flat Phantom; Flat Abdomen (1) Section;
Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0;
IEEE Head 458 MHz: σ = 0.89 mho/m εr = 43.9 ρ = 1.00 g/cm3 DAE: SN401 (08/21/03)
Cube 7x7x7: SAR (1g): 5.69 mW/g, SAR (10g): 4.08 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 46.5, 121.5, 4.7
Power drift: -1.12 dB





APPENDIX C

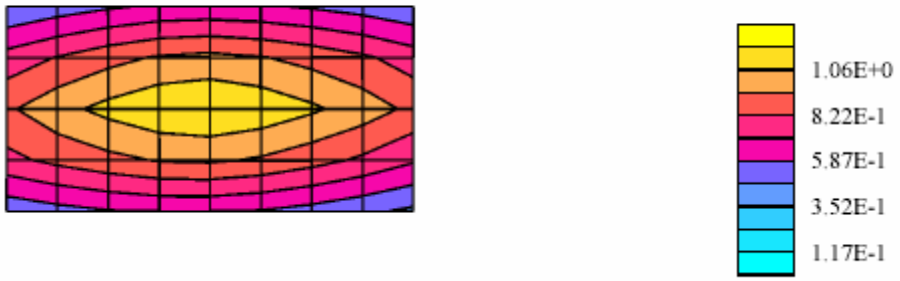
Dipole System Performance Check Results

SPEAG 450MHz Dipole; D450V2, SN1002; Test date:11/17/03

Run #: Sys Perf-R2-031117-01
TX Freq: 450 MHz
Sim. Tissue Temp: 20.7 C
Start Power: 250mW

Target: 4.52 mW/g for 1g SAR, 2.99 mW/g for 10g SAR +/- 10% from system performance target 1/16/03.
SAR calculated 1g is 4.66 mW/g percent from target (including drift) is 3.13 %
SAR Calculated 10g is 3.08 mW/g Percent from target (including drift) is 3.08 %

Flat (2); Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Crest factor: 1.0; FCC Body 450: σ = 0.93 mho/m εr = 54.9 ρ = 1.00 g/cm3 DAE: SN401 (08/21/03)
Cubes (2): Peak: 1.80 mW/g ± 0.03 dB, SAR (1g): 1.16 mW/g ± 0.02 dB, SAR (10g): 0.767 mW/g ± 0.02 dB, (Worst case extrapolation) Penetration depth: 12.7 (11.4, 14.4) [mm]
Power drift: -0.02 dB

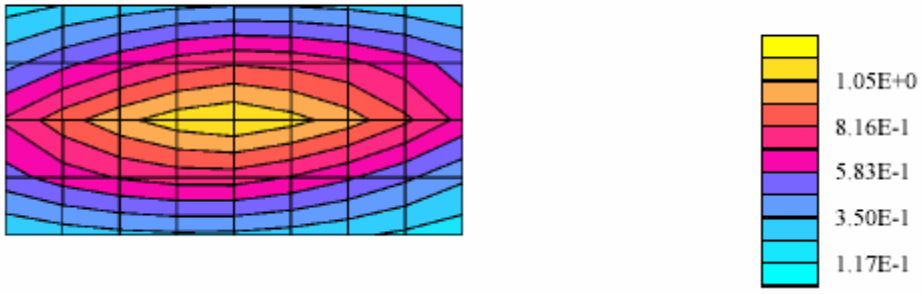


SPEAG 450MHz Dipole; D450V2, SN1002; Test date:11/18/03

Run #: Sys Perf-R2-031118-01
TX Freq: 450 MHz
Sim Tissue Temp: 20.7 C
Start Power: 250mW

Target: 4.52 mW/g for 1g SAR, 2.99 mW/g for 10g SAR +/- 10% from system performance target 1/16/03.
SAR calculated 1g is 4.63 mW/g percent from target (including drift) is 2.42 %
SAR Calculated 10g is 3.03 mW/g Percent from target (including drift) is 1.30 %

Flat (2); Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Crest factor: 1.0; FCC Body 450: σ = 0.93 mho/m εr = 55.1 ρ = 1.00 g/cm3 DAE: SN401 (08/21/03)
Cubes (2): Peak: 1.80 mW/g ± 0.01 dB, SAR (1g): 1.16 mW/g ± 0.01 dB, SAR (10g): 0.759 mW/g ± 0.01 dB, (Worst case extrapolation) Penetration depth: 12.5 (11.2, 14.2) [mm]
Power drift: 0.01 dB

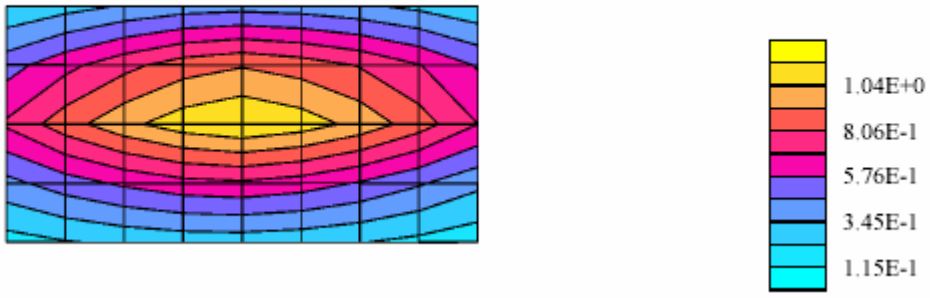


SPEAG 450MHz Dipole; D450V2, SN1002; Test date:11/19/03

Run #: Sys Perf-R2-031119-02
TX Freq: 450 MHz
Sim Tissue Temp: 20.5 C
Start Power: 250mW

Target: 4.52 mW/g for 1g SAR, 2.99 mW/g for 10g SAR +/- 10% from system performance target 1/16/03.
SAR calculated 1g is 4.71 mW/g percent from target (including drift) is 4.18 %
SAR Calculated 10g is 3.09mW/g Percent from target (including drift) is 3.44 %

Flat (2); Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Crest factor: 1.0; FCC Body 450: σ = 0.94 mho/m εr = 55.2 ρ = 1.00 g/cm3 DAE3: SN401(08/21/03)
Cubes (2): Peak: 1.83 mW/g ± 0.03 dB, SAR (1g): 1.18 mW/g ± 0.03 dB, SAR (10g): 0.775 mW/g ± 0.03 dB, (Worst case extrapolation) Penetration depth: 12.6 (11.2, 14.3) [mm]
Power drift: 0.01 dB

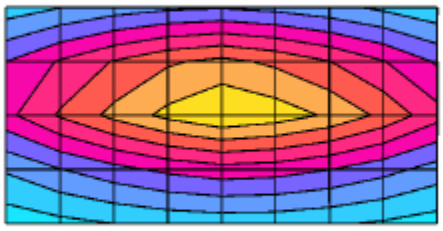


SPEAG 450MHz Dipole; D450V2, SN1002; Test date:11/19/03

Run #: Sys Perf-R2-031119-01
TX Freq: 450 MHz
Sim Tissue Temp: 20.5 C
Start Power: 250mW

Target:4.70 mW/g for 1g SAR, 3.11 mW/g for 10g SAR +/- 10% from system performance target 1/16/03.
SAR calculated 1g is 5.01 mW/g percent from target (including drift) is 6.63%
SAR Calculated 10g is 3.26 mW/g Percent from target (including drift) is 4.81%

Flat; Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Crest factor: 1.0; IEEE Head 450 MHz: σ = 0.89 mho/m εr = 44.1 ρ = 1.00 g/cm3 DAE3: SN401(08/21/03)
Cubes (2): Peak: 1.96 mW/g ± 0.02 dB, SAR (1g): 1.25 mW/g ± 0.03 dB, SAR (10g): 0.813 mW/g ± 0.03 dB, (Worst case extrapolation) Penetration depth: 12.2 (10.9, 14.0) [mm]
Power drift: -0.01 dB

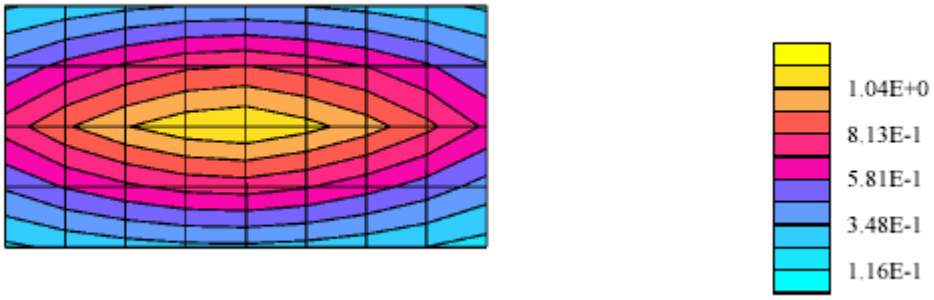


SPEAG 450MHz Dipole; D450V2, SN1002; Test date:11/20/03

Run #: Sys Perf-R2-031120-01
TX Freq: 450 MHz
Sim Tissue Temp: 20.7 C
Start Power: 250mW

Target:4.52 mW/g for 1g SAR, 2.99 mW/g for 10g SAR +/- 10% from system performance target 1/16/03.
SAR calculated 1g is 4.65 mW/g percent from target (including drift) is 2.89%
SAR Calculated 10g is 3.06mW/g Percent from target (including drift) is 2.41 %

Flat (2); Probe: ET3DV6 - SN1383 (Cal Date 26 February 2003); ConvF(7.50,7.50,7.50); Crest factor: 1.0; FCC Body 450: σ = 0.93 mho/m εr = 55.3 ρ = 1.00 g/cm3 DAE3: SN401(08/21/03)
Cubes (2): Peak: 1.80 mW/g ± 0.02 dB, SAR (1g): 1.16 mW/g ± 0.02 dB, SAR (10g): 0.764 mW/g ± 0.01 dB, (Worst case extrapolation) Penetration depth: 12.6 (11.3, 14.3) [mm]
Power drift: -0.01 dB



SYSTEM VALIDATION

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
Power Output (radio): _____ mW

Target SAR Value: 4.9 mW/g, 3.3 mW/g (10g avg.)
(normalized to 1.0 W)

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

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

Percent Difference From Target (MUST be within System Uncertainty): 4.05 % (1g ave)
5.75 % (10g ave)

Test performed by: J. Fortier Initial: 

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:

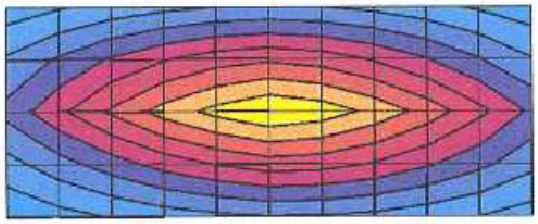
Dipole D450V2 SN1002; Test date:01/16/03

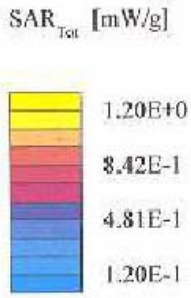
Run #: Sys Val_R3_030116-04 Phantom #:80302002B/S6
Model #: D450V2 SN: 1002
Robot: CGISS-3 Tester: J. Fortier
TX Freq: 450 MHz Sim Tissue Temp: 21.2 (Celsius)
Start Power: 250mW
DAE3: SN:406 DAE Cal Date: 11/11/02

- 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





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 Phantom #:80302002C/S7
Model #: D450V2 SN: 1002
Robot: CGISS-3 Tester: J. Fortier
TX Freq: 450 MHz Sim Tissue Temp: 21.5 (Celsius)
Start Power: 250mW
DAE3: SN:406 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