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

Date of Report:	May 15, 2003
Report Revision:	Rev. O
Manufacturer:	Motorola
Product Description:	Portable 450-488 MHz 2-5W No keypad, w/ top mounted display
FCC ID:	**AZ489FT4861**
Device Model:	H10SDD9PW6AN

Test Period:	4/23/03 – 5/01/03
EME Technician:	Ed Church
EME Engineer:	Deanna Zakharia Elect. Principle Staff Eng.
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 — 5/16/03

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

Date Approved

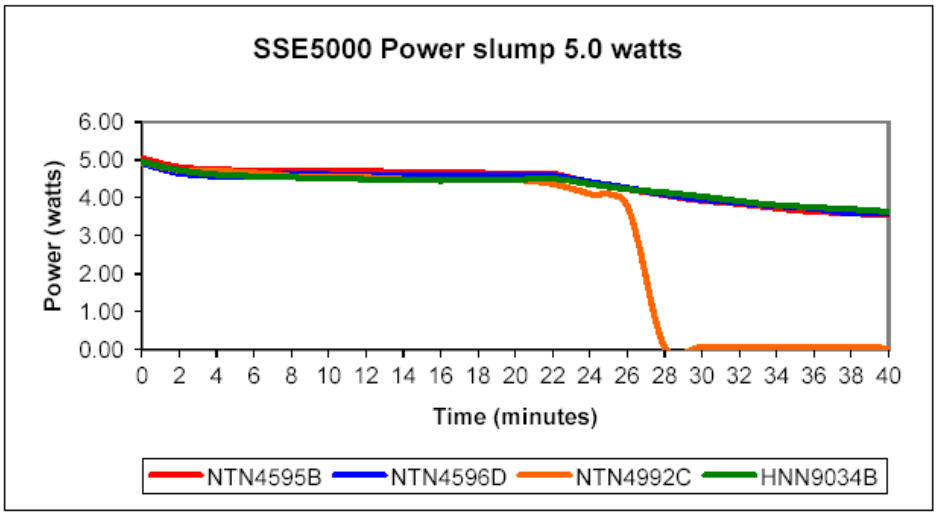
APPENDIX A

Power Slump Data/Shortened Scan

DUT Power versus time Data

Start Date and Time:5/14/2003 9:50:21 AM
Stop Date and Time: 5/14/2003 10:36:28 AM
Freq 469.0625
Radio 084

Time (minutes)	NTN4595B	NTN4596D	NTN4992C	HNN9034B
0	5.04	4.92	4.94	4.95
2	4.81	4.65	4.73	4.73
4	4.76	4.57	4.72	4.62
6	4.72	4.56	4.66	4.57
8	4.73	4.63	4.57	4.54
10	4.70	4.62	4.54	4.52
12	4.70	4.61	4.54	4.50
14	4.69	4.61	4.50	4.49
16	4.68	4.59	4.48	4.46
18	4.66	4.59	4.47	4.49
20	4.64	4.62	4.47	4.49
22	4.63	4.59	4.37	4.51
24	4.40	4.42	4.10	4.37
26	4.23	4.27	3.80	4.23
28	4.08	4.09	0.07	4.15
30	3.93	3.96	0.07	4.04
32	3.84	3.87	0.09	3.92
34	3.73	3.79	0.05	3.81
36	3.64	3.72	0.07	3.75
38	3.59	3.59	0.07	3.71
40	3.54	3.60	0.04	3.64



Shortened Scan Results

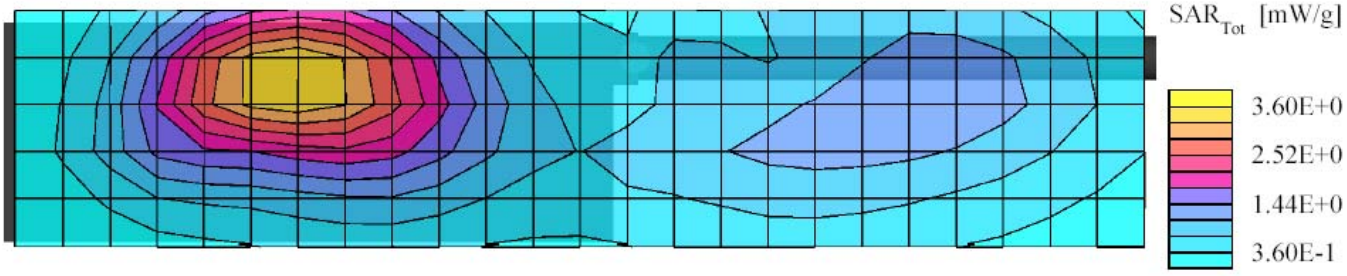
All scans presented in APPENDIX B reflect the shortest test time (7 minutes) assessment possible with this product. See section 5.0 for details.

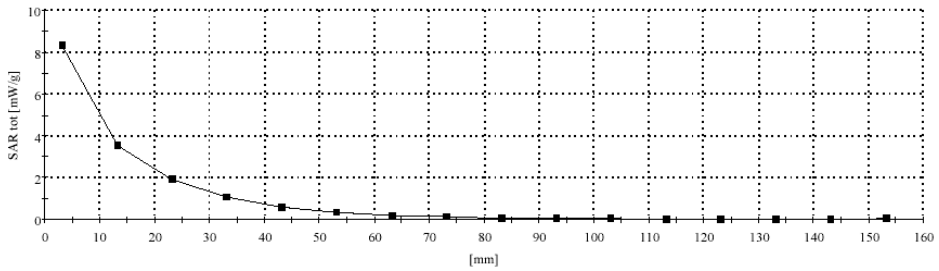
APPENDIX B
Data Results

FCC ID: AZ48FT4861; Test Date: 4/29/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030429-03
MODEL #: H10SDD9PW6AN SER #: 84
TX FREQ: 469 MHz
SIM TEMP: 20.6 C
START PWR: 5.00 W

ANTENNA KIT #: 8505247K06
BATTERY KIT #: NTN4595D
ACCESSORIES: BELT CLIP #: NNTN4709A
AUDIO ACCESSORIES: RSM #: NMN6225B

DUT w/ belt clip against the phantom
7 minute cube scan
Flat Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1383 (Cal Date 02-26-2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0; FCC Body 469: σ = 0.94 mho/m ε = 55.0 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 2/19/03
Cube 5x5x7: SAR (1g): 7.26 mW/g, SAR (10g): 4.77 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 22.5, 88.5, 3.2
Power drift: -0.16 dB

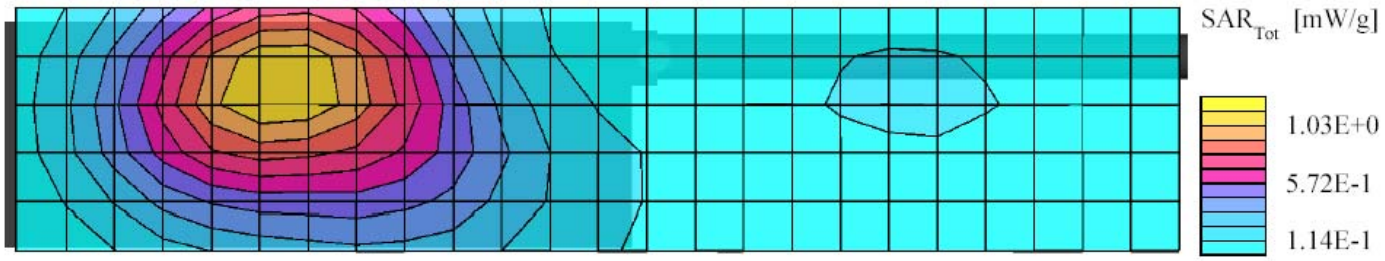


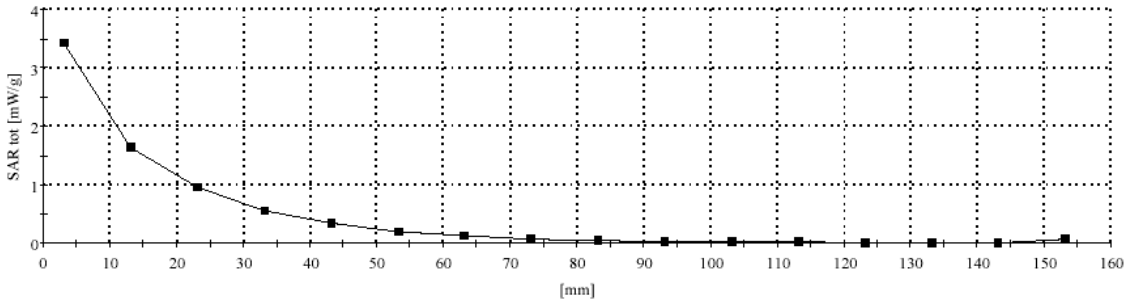


FCC ID: AZ48FT4861; Test Date: 4/30/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030430-04
MODEL #: H10SDD9PW6AN SER #: 84
TX FREQ: 469 MHz
SIM TEMP: 20.5 C
START PWR: 5.09 W

ANTENNA KIT #: 8505247K06
BATTERY KIT #: NTN4595D
ACCESSORIES: CARRY CASE #: NTN5644ASP01
BELT LOOP #: 4205633T01
AUDIO ACCESSORIES: RSM #: NMN6225B

DUT w/ carry case against the phantom
7 minute cube scan
Flat Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1383 (Cal Date 02-26-2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0; FCC Body 469: σ = 0.94 mho/m ε = 54.7 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 2/19/03
Cube 5x5x7: SAR (1g): 3.01 mW/g, SAR (10g): 2.10 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 24.0, 81.0, 3.2
Power drift: -0.07 dB

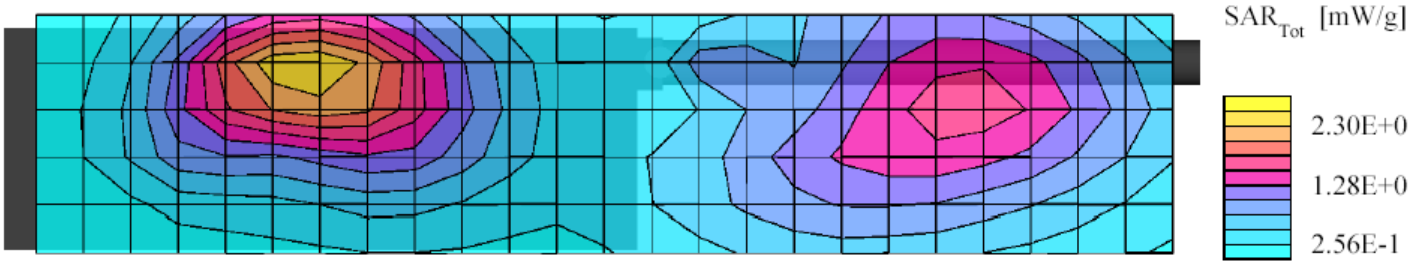


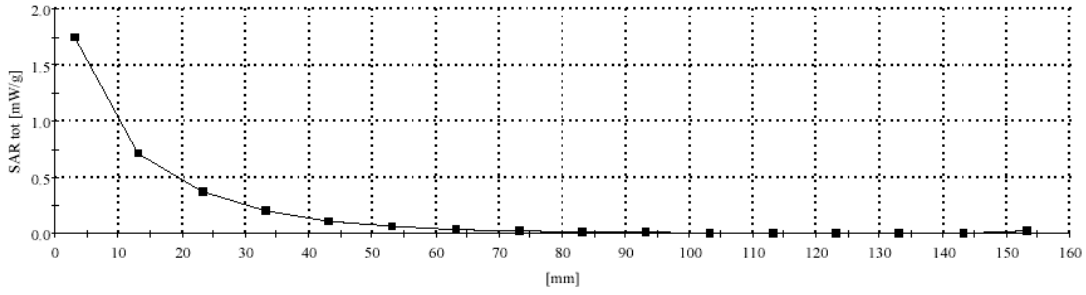


FCC ID: AZ48FT4861; Test Date: 4/30/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030430-06
MODEL #: H10SDD9PW6AN SER #: 84
TX FREQ: 469 MHz
SIM TEMP: 20.5 C
START PWR: 5.12 W

ANTENNA KIT #: 8505247K06
BATTERY KIT #: NTN4595D
ACCESSORIES: BELT CLIP #: NNTN4709A
AUDIO ACCESSORIES: SURVEILLANCE KIT#: ZMN6032A
SURVEILLANCE ADAPTER #: NTN5664D

DUT w/ carry case against the phantom.
7 minute cube scan
Flat Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1383 (Cal Date 02-26-2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0; FCC Body 469: σ = 0.94 mho/m ε = 54.7 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 2/19/03
Cube 5x5x7: SAR (1g): 1.51 mW/g, SAR (10g): 0.976 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 18.0, 85.5, 3.2
Power drift: -0.18 dB

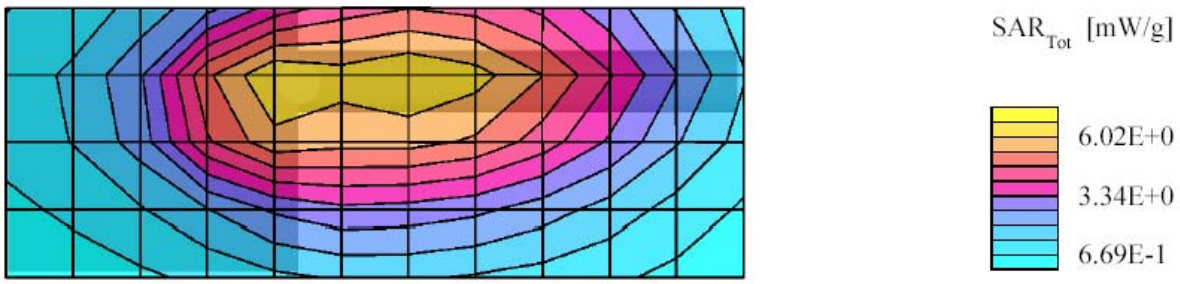


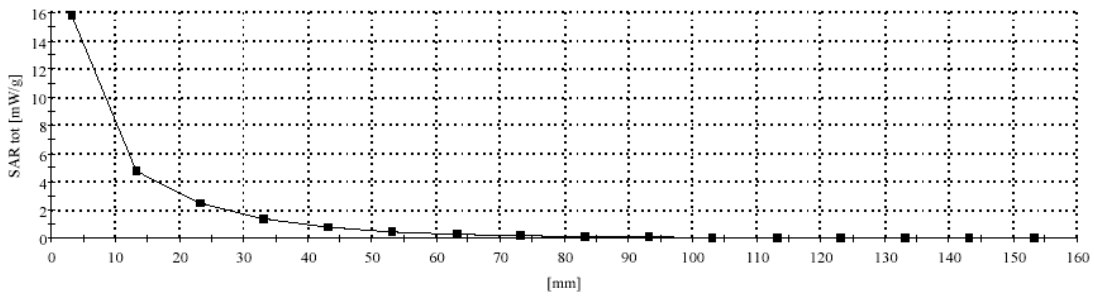


FCC ID: AZ48FT4861; Test Date: 4/23/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030423-02
MODEL #: H10SDD9PW6AN SER #: 84
TX FREQ: 469 MHz
SIM TEMP: 20.5 C
START PWR: 5.23 W

ANTENNA KIT #: 8505309N10
BATTERY KIT #: NTN4595D
ACCESSORIES: NONE
AUDIO ACCESSORIES: PSM #: NMN6129B
CLIP #: NMN6158A

DUT w/ PSM microphone clip against the phantom
7 minute cube scan
Flat Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1383 (Cal Date 02-26-2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0; FCC Body 469: σ = 0.92 mho/m ε = 54.2 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 2/19/03
Cube 5x5x7: SAR (1g): 13.3 mW/g, SAR (10g): 7.41 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 18.0, 61.5, 3.2
Power drift: -0.35 dB

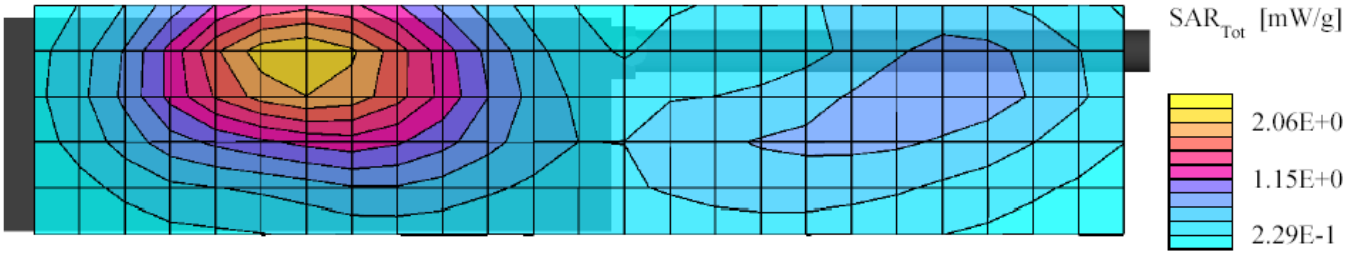


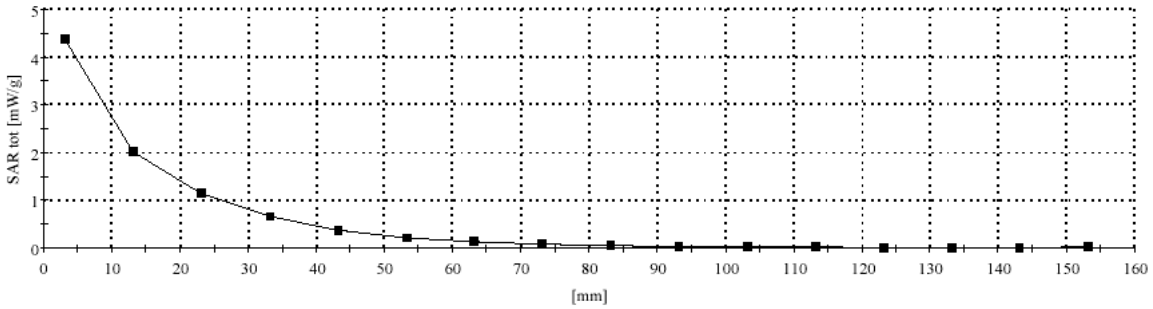


FCC ID: AZ48FT4861; Test Date: 4/30/03
Motorola CGISS EME Laboratory
RUN #: Ab-R3-030430-08
MODEL #: H10SDD9PW6AN SER #: 84
TX FREQ: 469 MHz
SIM TEMP: 20.6 C
START PWR: 4.95 W

ANTENNA KIT #: 8505247K06
BATTERY KIT #: NTN4595D
ACCESSORIES: NONE
AUDIO ACCESSORIES: RSM #: NMN6225B

DUT w/ back of housing 2.5 cm from the phantom
7 minute cube scan
Flat Phantom; Position: (90°,90°);
Probe: ET3DV6 - SN1383 (Cal Date 02-26-2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0; FCC Body 469:σ = 0.94 mho/m ε = 54.7 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 2/19/03
Cube 5x5x7: SAR (1g): 4.32 mW/g, SAR (10g): 2.95 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 18.0, 88.5, 3.2
Power drift: -0.46 dB

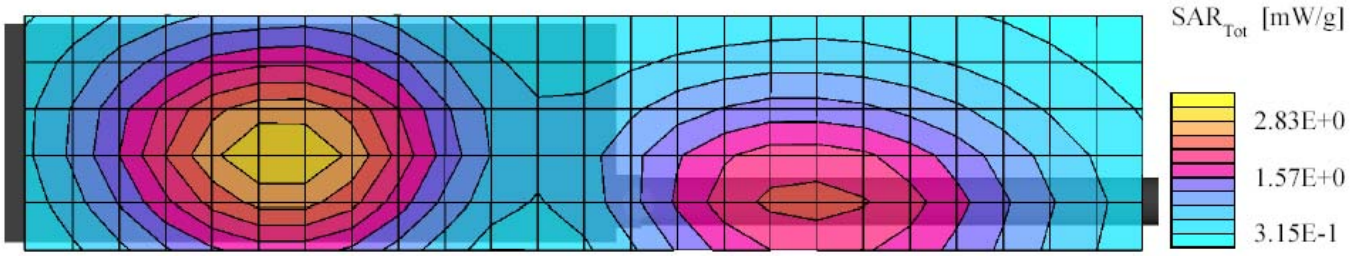


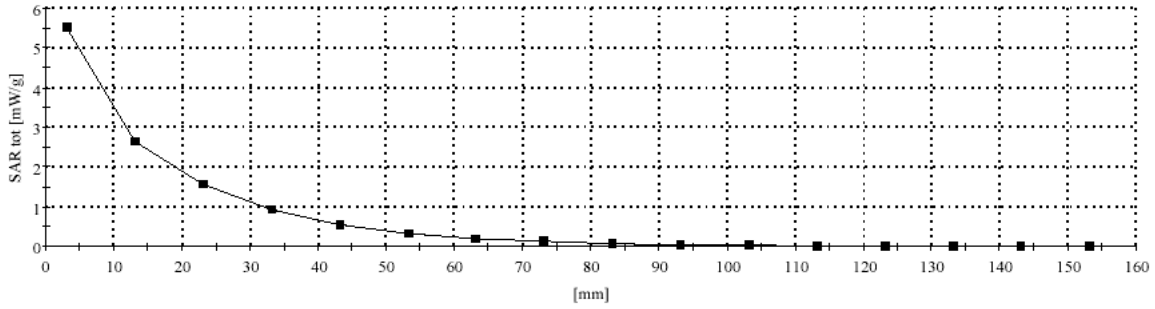


FCC ID: AZ48FT4861; Test Date: 5/01/03
Motorola CGISS EME Laboratory
RUN #: Face-R3-030501-08
MODEL #: H10SDD9PW6AN SER #: 84
TX FREQ: 488 MHz
SIM TEMP: 21.3 C
START PWR: 5.20 W

ANTENNA KIT #: 8505247K06
BATTERY KIT #: NTN4595D
ACCESSORIES: NONE
AUDIO ACCESSORIES: NONE

DUT w/ front of housing 2.5 cm from the phantom
7 minute cube scan
Flat Phantom; Flat_abdomen Section; Position: (90°,90°);
Probe: ET3DV6 - SN1383 (Cal Date 02-26-2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0; IEEE
Head 469 MHz: σ = 0.86 mho/m ε = 43.0 ρ = 1.00 g/cm3; DAE3 SN: 374 DAE CAL DATE: 2/19/03
Cube 5x5x7: SAR (1g): 5.40 mW/g, SAR (10g): 3.77 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 45.0, 81.0, 3.2
Power drift: -0.53 dB





APPENDIX C

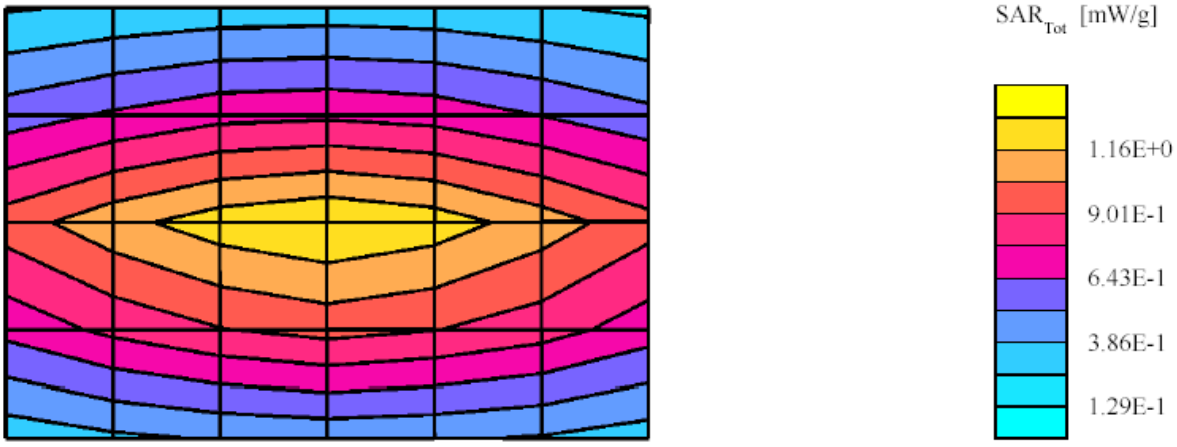
Dipole System Performance Check Results

Dipole validations at the head from SPEAG are provided herein. The CGISS EME lab validated the dipole to the applicable IEEE system performance targets. Within the same day system validation was performed using FCC body tissue parameters to generate the system performance target values for body at the applicable frequency. The results of the CGISS EME system performance validation are provided in this appendix.

SPEAG 450 MHz Dipole; Model D450V2, SN 1002; Test Date: 4/23/03
Motorola CGISS EME Lab
Run #: Sys Perf-R3-030423-01
TX Freq: 450 MHz
Sim Tissue Temp: 20.5 (Celsius)
Start Power; 250mW

Target at 1W is 4.52 W/g (1g)
SAR calculated is 4.45 W/g, Percent from target (including drift) for 1g is - 1.54 %

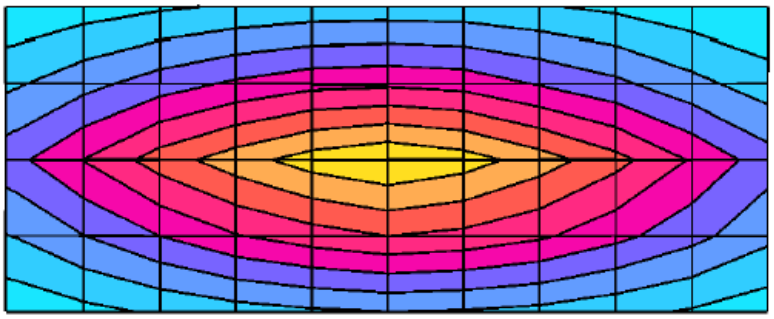
Flat Phantom; Probe: ET3DV6 - SN1383 (Cal Date 02-26-2003); Probe Cal Date: 26/02/03ConvF(7.50,7.50,7.50); Crest factor: 1.0; FCC Body 450: σ= 0.91mho/m ε= 54.5 ρ= 1.00 g/cm3; DAE3: SN:374 DAE Cal Date: 02/19/03
Cubes (3): Peak: 1.26 mW/g ± 18.01 dB, SAR (1g): 0.740 mW/g ± 0.00 dB, SAR (10g): 0.480 mW/g ± 0.00 dB, (Worst-case extrapolation) Penetration depth: 12.3 (9.4, 16.4) [mm]
Power drift: -0.01 dB



SPEAG 450 MHz Dipole; Model D450V2, SN 1002; Test Date: 4/29/03
Motorola CGISS EME Lab
Run #: Sys Perf-R3-030429-01
TX Freq: 450 MHz
Sim Tissue Temp: 20.6 (Celsius)
Start Power; 250mW

Target at 1W is 4.52 W/g (1g)
SAR calculated is 4.79 W/g, Percent from target (including drift) for 1g is 5.95 %

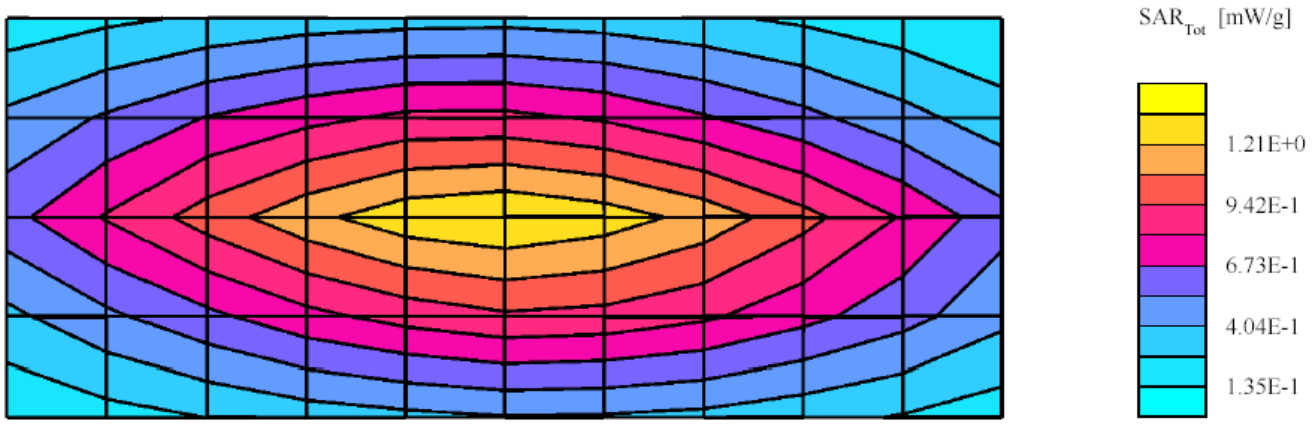
Flat Phantom; Probe: ET3DV6 - SN1383 (Cal Date 02-26-2003);Probe Cal Date: 26/02/03ConvF(7.50,7.50,7.50); Crest factor: 1.0; FCC Body 450: σ = 0.93 mho/m ε= 55.3 ρ = 1.00 g/cm3; DAE3: SN:374 DAE Cal Date: 02/19/03
Cubes (3): Peak: 2.05 mW/g ± 0.02 dB, SAR (1g): 0.801 mW/g ± 0.00 dB, SAR (10g): 0.515 mW/g ± 0.00 dB, (Worst-case extrapolation)Penetration depth: 12.2 (9.2, 16.3) [mm]
Power drift: 0.01 dB



SPEAG 450 MHz Dipole; Model D450V2, SN 1002; Test Date: 4/30/03
Motorola CGISS EME Lab
Run #: Sys Perf-R3-030430-01
TX Freq: 450 MHz
Sim Tissue Temp: 20.5 (Celsius)
Start Power; 250mW

Target at 1W is 4.52 W/g (1g)
SAR calculated is 4.66 W/g, Percent from target (including drift) for 1g is + 3.13 %

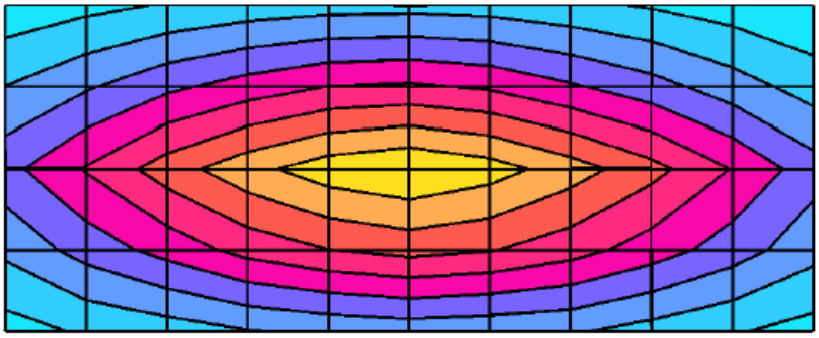
Flat Phantom; Probe: ET3DV6 - SN1383 (Cal Date 02-26-2003);Probe Cal Date: 26/02/03ConvF(7.50,7.50,7.50); Crest factor: 1.0; FCC Body 450: σ = 0.93 mho/m ε= 55.0 ρ = 1.00 g/cm3; DAE3: SN:374 DAE Cal Date: 02/19/03
Cubes (3): Peak: 1.31 mW/g ± 17.61 dB, SAR (1g): 0.770 mW/g ± 0.00 dB, SAR (10g): 0.498 mW/g ± 0.00 dB, (Worst-case extrapolation) Penetration depth: 12.2 (9.3, 16.3) [mm]
Power drift: -0.02 dB



SPEAG 450 MHz Dipole; Model D450V2, SN 1002; Test Date: 5/01/03
Motorola CGISS EME Lab
Run #: Sys Perf-R3-030501-01
TX Freq: 450 MHz
Sim Tissue Temp: 21.5 (Celsius)
Start Power; 250mW

Target at 1W is 4.70 W/g (1g)
SAR calculated is 4.45 W/g, Percent from target (including drift) for 1g is - 5.30 %

Flat Phantom; Probe: ET3DV6 - SN1383 (Cal Date 02-26-2003); ConvF(7.50,7.50,7.50); Probe cal date: 26/02/03; Crest factor: 1.0; IEEE Head 450 MHz: σ = 0.84 mho/m ε = 43.4 ρ = 1.00 g/cm3; DAE3: SN:374 DAE Cal Date: 02/19/03
Cubes (3): SAR (1g): 0.736 mW/g ± 0.00 dB, SAR (10g): 0.476 mW/g ± 0.00 dB, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 31.5, 75.0, 3.2
Power drift: -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: (normalized to 1.0 W, including drift)	4.52 mW/g,	2.99 mW/g (10g avg.)

Test performed by: J. Fortier Initial:

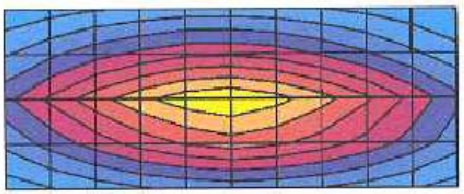
Sys. Per. Chk. Form: 021024

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

Run #: Sys Val_R3_030116-07 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: $\sigma = 0.92$ 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 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: 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

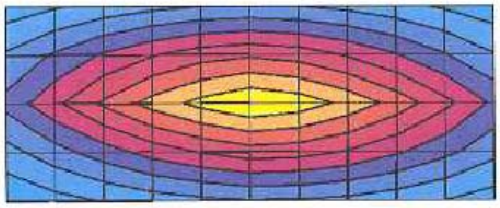
Dipole D450V2 SN1002; Test date:01/16/03

Run #: Sys Val_R3_030116-04 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



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:1383
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	February 26, 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	8-Mar-02	Mar-03
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	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: February 26, 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.

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Probe ET3DV6

SN:1383

Manufactured:	August 16, 1999
Last calibration:	February 21, 2002
Recalibrated:	February 26, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1383

Sensitivity in Free Space

Diode Compression

NormX	1.80 $\mu V/(V/m)^2$	DCP X	93	mV
NormY	1.55 $\mu V/(V/m)^2$	DCP Y	93	mV
NormZ	1.62 $\mu V/(V/m)^2$	DCP Z	93	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	6.5 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.5 ± 9.5% (k=2)	Alpha	0.59
ConvF Z	6.5 ± 9.5% (k=2)	Depth	1.97

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	5.2 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.2 ± 9.5% (k=2)	Alpha	0.57
ConvF Z	5.2 ± 9.5% (k=2)	Depth	2.54

Boundary Effect

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

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	10.0	5.2
SAR_{be} [%]	With Correction Algorithm	0.1	0.5

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

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	15.1	9.9
SAR_{be} [%]	With Correction Algorithm	0.2	0.0

Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	0.5 ± 0.2	mm

Schmid & Partner
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Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1383**
Place of Assessment:	**Zurich**
Date of Assessment:	**February 28, 2003**
Probe Calibration Date:	**February 26, 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:1383

Conversion factor (± standard deviation)

150 MHz	ConvF	8.1 ± 8%	ε_r = 61.9 σ = 0.80 mho/m (body tissue)
236 MHz	ConvF	7.9 ± 8%	ε_r = 59.8 σ = 0.87 mho/m (body tissue)
300 MHz	ConvF	7.8 ± 8%	ε_r = 58.2 σ = 0.92 mho/m (body tissue)
350 MHz	ConvF	7.8 ± 8%	ε_r = 57.7 σ = 0.93 mho/m (body tissue)
450 MHz	ConvF	7.5 ± 8%	ε_r = 56.7 σ = 0.94 mho/m (body tissue)
784 MHz	ConvF	6.5 ± 8%	ε_r = 55.4 σ = 0.97 mho/m (body tissue)
1450 MHz	ConvF	5.3 ± 8%	ε_r = 54.0 σ = 1.30 mho/m (body tissue)

Dosimetric E-Field Probe ET3DV6 SN:1383

Conversion factor (± standard deviation)

150 MHz ✓	ConvF	**9.0 ± 8%**	ε_r = 52.3 σ = 0.76 mho/m (head tissue)
236 MHz ✓	ConvF	**8.2 ± 8%**	ε_r = 48.3 σ = 0.82 mho/m (head tissue)
300 MHz ✓	ConvF	**7.7 ± 8%**	ε_r = 45.3 σ = 0.87 mho/m (head tissue)
350 MHz ✓	ConvF	**7.7 ± 8%**	ε_r = 44.7 σ = 0.87 mho/m (head tissue)
400 MHz ✓	ConvF	**7.5 ± 8%**	ε_r = 44.4 σ = 0.87 mho/m (head tissue - CENELEC)
450 MHz ✓	ConvF	**7.5 ± 8%**	ε_r = 43.5 σ = 0.87 mho/m (head tissue)
784 MHz ✓	ConvF	**6.7 ± 8%**	ε_r = 41.8 σ = 0.90 mho/m (head tissue)

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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:	Jovanic Katya
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.

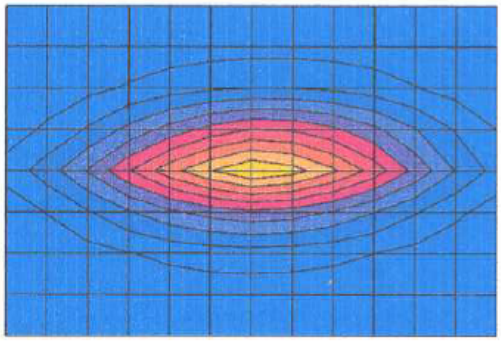
5. Design

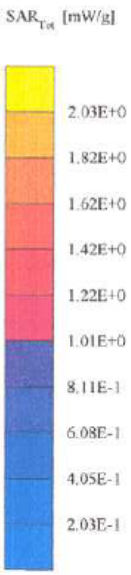
The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

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: σ = 0.86 mho/m ε_r = 44.5 ρ = 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]





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: AZ489FT4861. 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 NTN5644ASP01/
4205633T01/NTN5574ASP02
Back View

Photo 2.
Model NTN5644ASP01/
4205633T01/NTN5574ASP02
Front View

Photo 3.
Model NTN5644ASP01/
4205633T01/NTN5574ASP02
Side View

Photo 4.
Model NNTN4709A
Back View

Photo 5.
Model NNTN4709A
Side View

Appendix F
Applicable Accessories and options test status and separation distances

The following table summarizes the test status and separation distance provided by each of the body-worn accessories:

Carry Case Models	Tested ?	Closest Separation distances between DUT antenna and phantom surface. (mm)	Comments
NNTN4709A	Yes	27-42	
4205633T01	Yes	85-141	Tested w/ NTN5644ASP01&NTN5574ASP02
NTN5644ASP01	Yes	85-141	Tested w/ 4205633T01& NTN5574ASP02
NMM6158A	Yes	19-22	Tested w/ PSM NMN6129B
NTN5574ASP02	Yes	NA	Tested w/ 4205633T01& NTN5644ASP01

Audio Attachments	Tested ?	Closest Separation distances between DUT antenna and phantom surface. (mm)	Comments
NMN6129B	Yes	NA	NA
NMN6225B	Yes	NA	NA
ZMN6032A	Yes	NA	NA
NTN5664D	Yes	NA	NA
ZMN6038A	No	NA	Same as ZMN6032A except for extra loud feature.