



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

**S.A.R. EME Compliance Test Report**

**Attention:** Federal Communication Commission  
**Date of Report:** April 16, 2003  
**Report Revision:** Rev. D  
**Device Manufacturer:** Motorola  
**Device Description:** Hand Held Wireless Data Terminal  
**FCC ID:** AZ492FT5802  
**Device Model:** F5027A

**Test Period:** 3/19/02 – 3/20/02

**Test Engineer:** Stephen Whalen  
Sr. Test Engineer

**Author:** Michael Sailsman  
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

4/24/03

\_\_\_\_\_  
Ken Enger  
Senior Resource Manager, Product Safety and EME Director

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Date Approved

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## REVISION HISTORY

Date	Revision	Comments
10/16/00	O	Original
12/12/00	A	Updated to include additional carry case FLN9202A.
02/08/01	B	Changed from Controlled to Uncontrolled exposure limits.
4/15/02	C	PCII Disclosure of new results based on change in intended use and new Air Born Express carry case accessory.
4/16/03	D	Incorrect FCC ID corrected

## **1.0 Introduction**

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (S.A.R.) measurements performed at the Motorola CGISS EME Test Lab for the Handheld Data Terminal with wireless LAN, model number F5027A, FCC ID AZ492FT5802. The results presented herein reflect disclosure of additional performance data when the device is operated while in a users shirt pocket as well as in a new holster offered for this product.

The applicable exposure environment is General Population/Uncontrolled.

The test results included herein represent the highest S.A.R. levels applicable to this product and clearly demonstrate compliance with FCC General Population/Uncontrolled RF Exposure limits of 1.6 mW/g per the requirements of 47 CFR 2.1093(d).

## **2.0 Reference Standards and Guidelines**

This product is designed to comply with the following national and international standards and guidelines.

- United States Federal Communications Commission, Code of Federal Regulations; 47CFR part 2 sub-part J
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Terminal frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Terminal communications (Electromagnetic Radiation - Human Exposure) Standard 2001
- ANATEL, Brazil Regulatory Authority, Resolution 256 (April 11, 2001) "additional requirements for SMR, cellular and PCS product certification."

### 3.0 Description of Test Sample



Model F5027A is a hand held data terminal. The terminal's intended use will be for data acquisition during delivery of packages. It is used while in a holster next to the body, in a users shirt pocket, or handheld in front of the operator.

The device contains a 900MHz wireless LAN radio manufactured by RIM. The OEM radio module (FCC ID L6AR902M-2-0) transmits in the Gaussian Minimum Shift Keying (GMSK) mode with a maximum output of 2.0 watts and a maximum duty cycle of 25%.

The device incorporates an internal  $\frac{1}{4}$  wave monopole antenna. The transmit frequency range for this device is 896 to 901 MHz.

The sample device tested for this report represent an identical prototype to those intended for production.

This device is offered with the following options and accessories:

**Batteries:**

FNN6001B Li Ion 1400 mAH

**Additional Body-Worn Accessory:**

ABF960 Air Borne Specific Holster

**Antenna:**

Internal ¼ wave Monopole

**3.1 Test Signal**

**Test Signal mode:**

Test Mode	<input checked="" type="checkbox"/>	Base Station	<input type="checkbox"/>	Simulator	<input type="checkbox"/>
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**Transmission Mode:**

<b>CW</b>	<input checked="" type="checkbox"/>
<b>Native Transmission</b>	<input type="checkbox"/>
<b>TDMA</b>	<input type="checkbox"/>
<b>Other</b>	<input type="checkbox"/>

**3.2 Test Output Power**

This data terminal uses an inaccessible internal antenna. For this reason a power vs. time characteristic curve was generated prior to S.A.R. measurements on the device for a time interval greater than the expected S.A.R. measurement duration. This curve is then used to determine the power slump characteristics at the actual end of the S.A.R. measurement.

## 4.0 Description of Test Equipment

### 4.1 Descriptions of S.A.R. Measurement System

The laboratory utilizes the latest version of a Dosimetric Assessment System (DASY3™) S.A.R. measurement system manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. The S.A.R. measurements were conducted with probe model/serial number ET3DV6/SN1547. The system performance check was conducted daily and within 24 hours prior to testing. A copy of the probe calibration certificates and the DASY output files of the system performance test results are included in APPENDIX C. The table below summarizes the system performance check results normalized to 1W.

Probe Serial #	Tissue Type	Probe Cal Date	Dipole Kit / Serial #	System Perf. Result when normalized to 1W (mW/g)	Reference S.A.R. @ 1W (mW/g)	Test Date
1547	FCC Body	11/16/01	D835V2 SN # 427	10.74	10.82	3/19/02
1547	FCC Body	11/16/01	D835V2 SN # 427	10.54	10.82	3/20/02

The DASY3™ system is operated per the instructions in the DASY3™ Users Manual. The complete manual is available directly from SPEAG™.

### 4.2 Description of Phantom

#### 4.2.1 Body Phantom:

##### Flat Phantom:

A rectangular shaped box made of high-density polyethylene (HDPE) with a dielectric constant of 2.26 and a loss tangent of less than 0.00031. The phantom is mounted on a wooden supporting structure that has a loss tangent of < 0.05. The structure has a 68.6 cm x 25.4 cm opening at its center to allow positioning the DUT to the phantom's surface. The supporting structure is assembled with wooden pegs and glue. The table below shows the flat phantom dimensions.

<b>Length</b>	80cm
<b>Width</b>	30cm
<b>Height</b>	20cm
<b>Surface Thickness</b>	0.2cm

### 4.3 Simulated Tissue Properties:

#### 4.3.1 Type of Simulated Tissue

The simulated tissue used is compliant to that specified in FCC Supplement C (Edition 01 - 01) to OET Bulletin 65 (Edition 97 - 01).

Simulated Tissue	Body Position
Body	Abdomen

#### 4.3.2 Simulated Tissue Composition

Frequency (898 MHz)	
Body	
Sugar	44.9
Water	53.06
Salt	0.94
HEC	1.0
Bactericide	0.1

#### Characterization of Simulated tissue materials and ambient conditions:

Simulated tissue prepared for S.A.R. measurements is measured daily and within 24 hours prior to actual S.A.R. testing to verify that the tissue is within 5% of target parameters at the center of the transmit band. This measurement is done using the Agilent (HP) probe kit model 85070C and a HP8753D Network Analyzer calibration date 12/4/01.

#### Target tissue parameters

Body		
Frequency(MHz)	Di-electric Constant	Conductivity – S/m
898	55.01	1.05

#### 4.4 Test conditions:

The EME Laboratory ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/- 2°C of the temperature at which the dielectric properties were determined. Additional precautions are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environment is continuously monitored. The table below represents the average environmental conditions during the S.A.R. tests reported herein:

<b>Ambient Temperature</b>	20.9 °C
<b>Relative Humidity</b>	49.9 %
<b>Tissue Temperature</b>	21.8 °C

The EME Lab RF environment uses a Spectrum Analyzer to monitor for extraneous large signal RF contaminants that could possibly affect the test results. If such unwanted signals are discovered the S.A.R. scans are repeated. However, the lab environment is sufficiently protected such that no S.A.R. impacting interference has been experienced to date.

#### 5.0 Description of Test Procedure

All options and accessories listed in section 3.0 were included in the S.A.R. test plan in order to determine the highest S.A.R. levels. S.A.R. measurements were taken at the abdomen. Tests were performed with the device output power set to 500 mW. This reflects a normal operating duty cycle characteristic of 25%. The device was operating in a continuous wave (CW) test mode for all measurements. Each S.A.R. scan was taken with a fully charged battery.

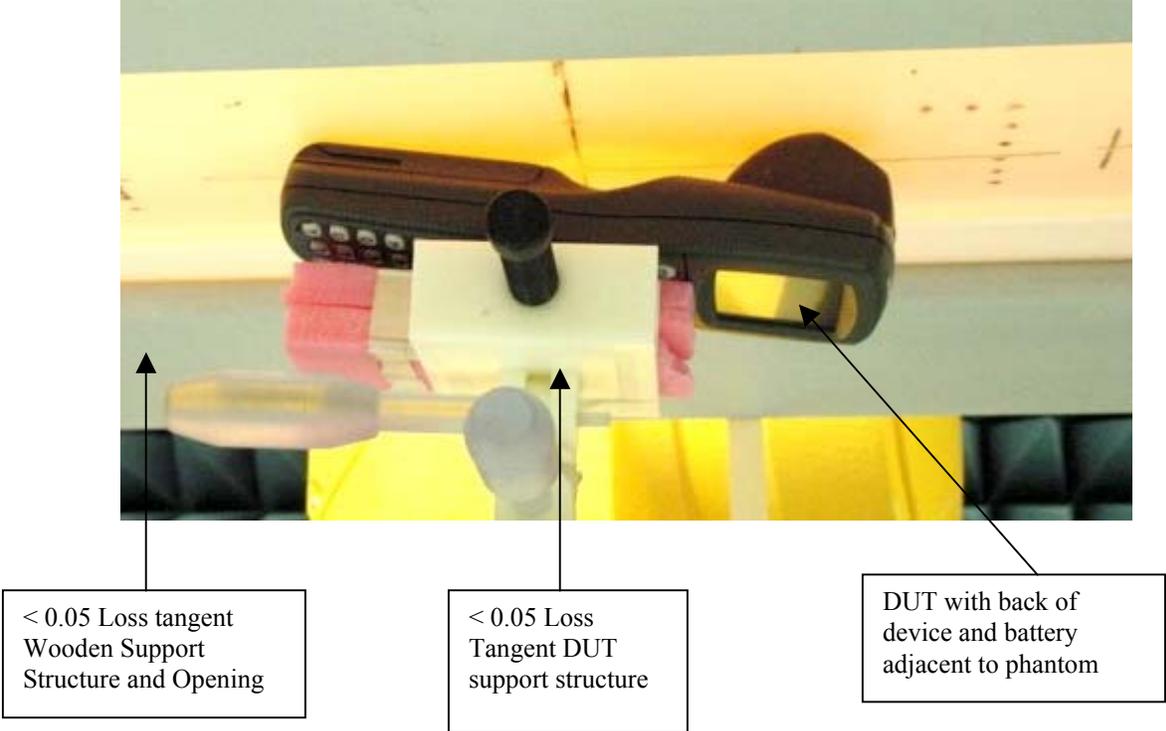
#### 5.1 Device Test Positions

S.A.R. measurements were performed with the display facing towards and away from the phantom using battery model FNN6001B and body-worn accessory model ABF960 at the center frequency of transmit band. Additional measurements were performed with the device adjacent to the phantom with out the body worn accessory to assess shirt pocket user configuration performance.

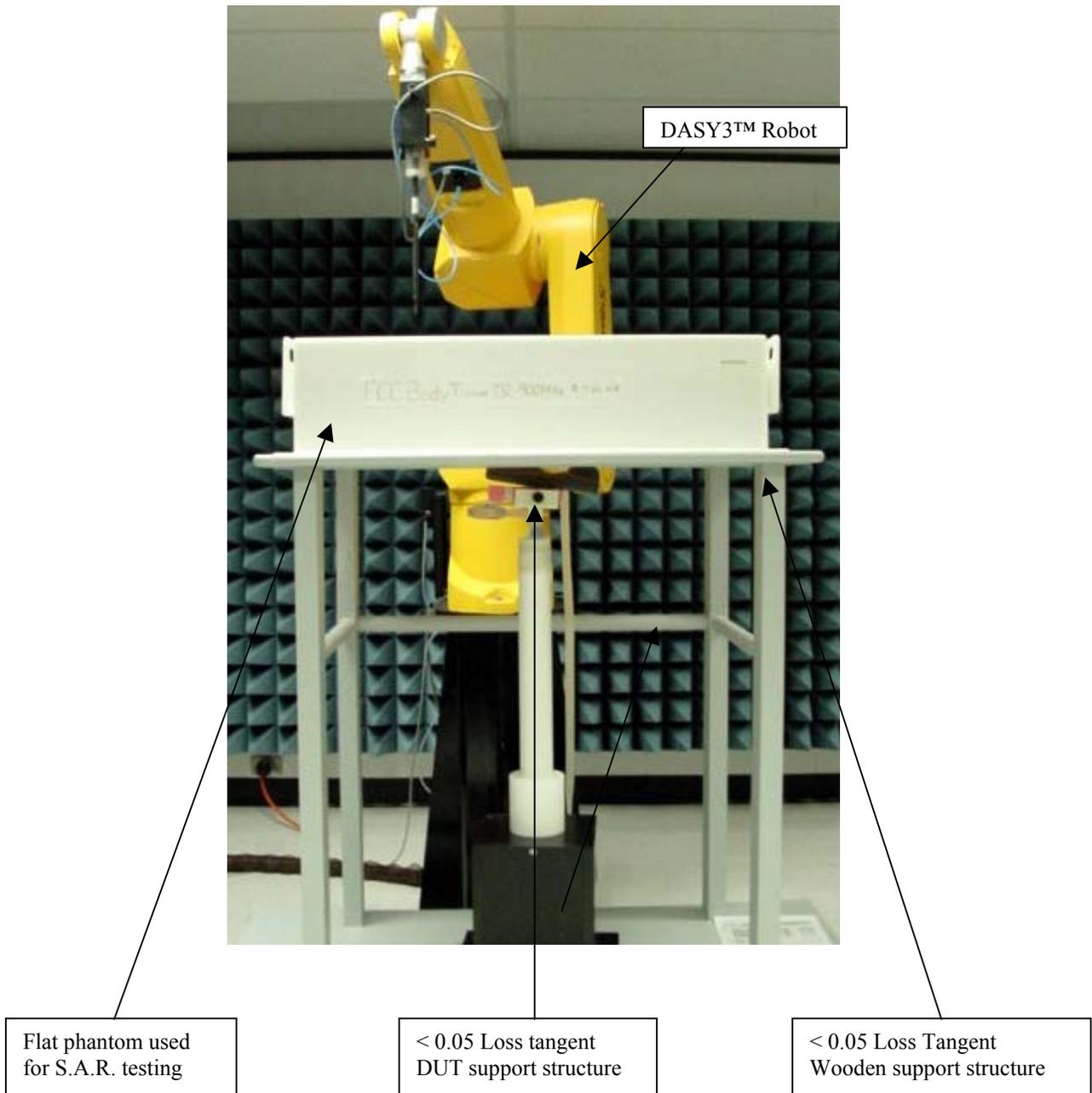
##### 5.1.0 Abdomen

A flat phantom containing simulated body tissue consistent with applicable standards was used to assess S.A.R. performance of the device.

**Figure 1:** Highest S.A.R. configuration



**Figure 2:** Robot Test System



## 5.2 Probe Scan Procedures

The E-field probe is first scanned in a coarse grid over a large area inside the phantom in order to locate the interpolated maximum S.A.R. distribution. After the coarse scan measurement, the probe is automatically moved to a position at the interpolated maximum. The subsequent scan can directly use this position as reference for the cube evaluations.

## 6.0 Measurement Uncertainty:

The table below lists the uncertainty estimate of the possible errors that are associated with the measurement system.

Uncertainty Description	Standard Uncertainty
<b>Probe Uncertainty</b>	
- Axial Isotropy	± 2.4 %
- Spherical Isotropy	± 4.8 %
- Spatial Resolution	± 0.5 %
- Linearity Error	± 2.7 %
- Calibration Error	± 8 %
<b>Evaluation Uncertainty</b>	
- Data Acquisition Error	± 0.60 %
- ELF and RF Disturbances	± 0.25 %
- Conductivity Assessment	± 5 %
<b>Spatial Peak SAR Evaluation Uncertainty</b>	
- Extrapolation and boundary effects	± 3%
- Probe positioning	± 1 %
- Integration and cube orientation	± 3 %
- Cube shape inaccuracies	± 1.2 %
- Device positioning	± 1.0 %

The Total Measurement Uncertainty is ± 12.1 %. The Expanded Measurement Uncertainty is ± 24.2 % (k=2)

## 7.0 S.A.R. Test Results:

All S.A.R. results obtained by the tests described in Section 5.0 are listed in section 7.1 below. The initial power stated in section 7.1 reflects a 25% duty cycle of the maximum reported conducted power output of this device. The bolded result indicates the highest observed S.A.R. performance. No scaling was done to obtain the S.A.R. results presented. DASY3™ S.A.R. measurement scans are provided in APPENDIX A for the highest observed S.A.R.

### 7.1 S.A.R. results at the abdomen:

Run Number	Freq. (MHz)	Battery	Carry Case	Initial Power (mW)	End Power (mW)	Measured 1g-S.A.R. 25% duty cycle (mW/g)
Ab_R1_020320-03	898	FNN6001B	None Front Position	0.500	0.511	0.13
Ab_R1_020320-02	898	FNN6001B	None Back Position	0.500	0.511	<b>0.45</b>
Ab_R1_020319-07	898	FNN6001B	ABF960 Front Position	0.500	0.511	0.16
Ab_R1_020319-08	898	FNN6001B	ABF960 Back Position	0.500	0.511	0.37

### 7.3 Peak S.A.R. location

The peak S.A.R. was observed near the bottom of the device.  
Refer to APPENDIX A for detailed S.A.R. scan distributions.

## 8.0 Conclusion

The highest Operational 1-gram average S.A.R values found for the hand held data terminal model number F5027A with the new body worn accessory and user configuration at the abdomen is **0.45 mW/g**. This reflects higher results than the previously reported value of **0.14mW/g**.

The updated test result clearly demonstrate compliance with FCC General Population/Uncontrolled RF Exposure limits of **1.6 mW/g** per the requirements of 47 CFR 2.1093(d)

**APPENDIX A**  
**DATA RESULTS**



**Data Terminal F5027A; Test Date: 03/20/02**

**Motorola CGISS EME Laboratory**

Model #: F5027A SN: 312SAS0079

Run #: Ab\_R1\_020320-02

Tissue Temp: 20.5 (Celsius)

TX Freq: 898.5 MHz

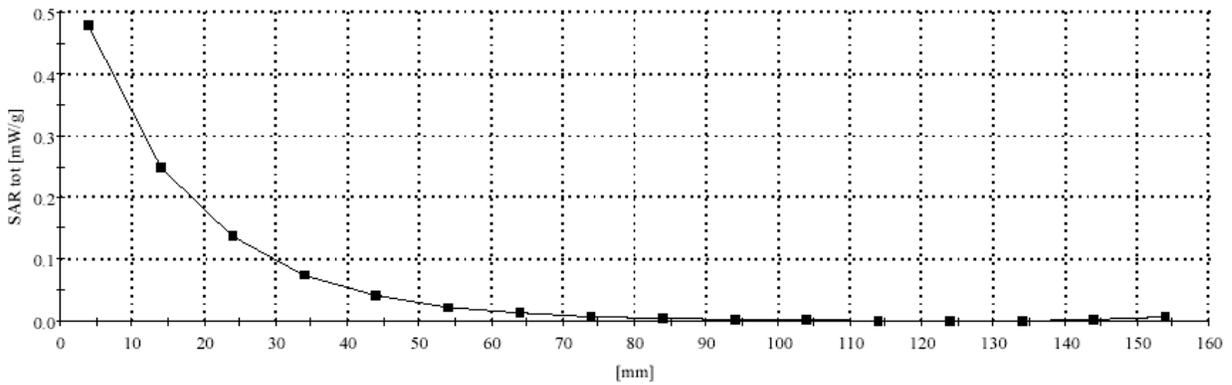
Accessories:

Antenna: internal; Battery Kit: FNN6001B

Flat Phantom Phantom; Section; Position: ; Frequency: 899 MHz

Probe: ET3DV6 - SN1547; ConvF(6.20,6.20,6.20); Crest factor: 1.0; FCC Body\_898MHz:  $\sigma = 1.06$  mho/m  $\epsilon = 52.6$   $\rho = 1.00$  g/cm<sup>3</sup>; DAE3: 363-V1 DAE Cal Date: 08/22/01

Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 10.0,



**Data Terminal F5027A; Test Date: 03/19/02**

**Motorola CGISS EME Laboratory**

Model #: F5027A SN: 312SAS0079

Run #: Ab\_R1\_020319-08

Tissue Temp: 20.5 (Celsius)

TX Freq: 898.5 MHz

Accessories:

Antenna: internal; Battery Kit: FNN6001B

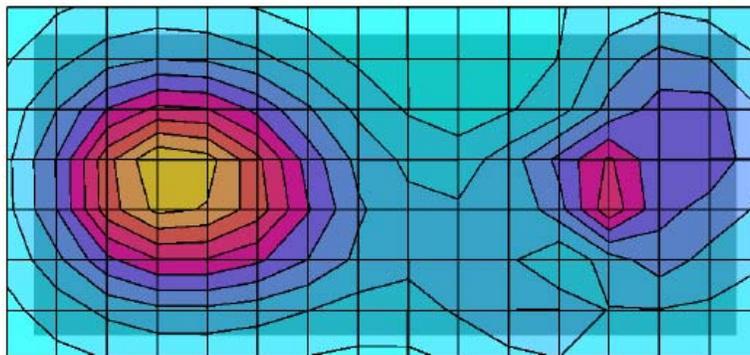
Holster: ABF960.

Flat Phantom; Device Section; Position: (90°,0°);

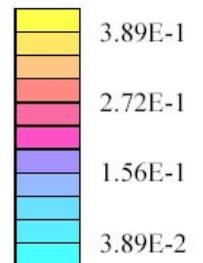
Probe: ET3DV6 - SN1547; ConvF(6.20,6.20,6.20); Probe cal date: 11/16/01; Crest factor: 1.0; FCC Body\_898MHz:  $\sigma = 1.06$  mho/m  $\epsilon = 52.5$   $\rho = 1.00$  g/cm<sup>3</sup>; DAE3: 363-V1 DAE Cal Date: 08/22/01

Cube 7x7x7:SAR (1g): 0.372 mW/g, (Worst-case extrapolation); Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 48.0, 55.5, 4.0

Device Back/Battery Towards Phantom



SAR<sub>Tot</sub> [mW/g]



Bottom of device (keypad)

Top of device (display)

**Data Terminal F5027A; Test Date: 03/19/02**

**Motorola CGISS EME Laboratory**

Model #: F5027A SN: 312SAS0079

Run #: Ab\_R1\_020319-08

Tissue Temp: 20.5 (Celsius)

TX Freq: 898.5 MHz

Accessories:

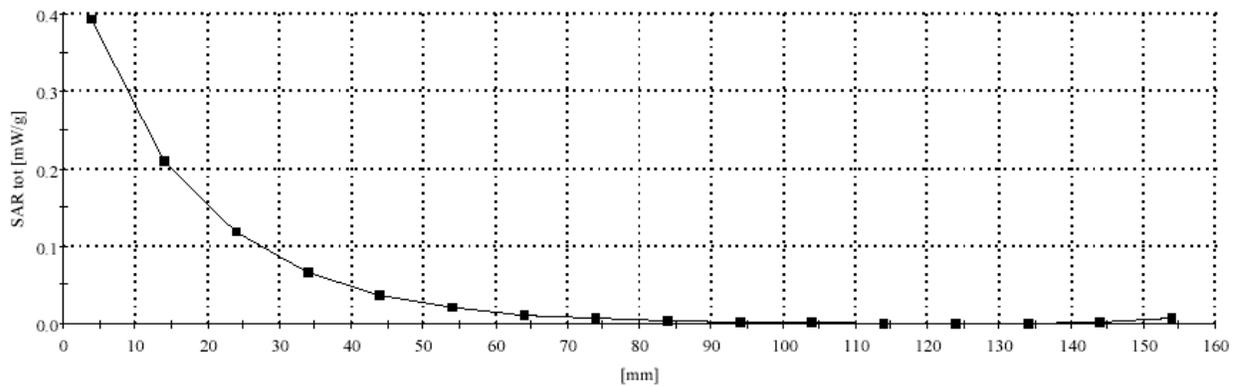
Antenna: internal; Battery Kit: FNN6001B

Holster: ABF960

Flat Phantom; Section; Position: Frequency: 899 MHz

Probe: ET3DV6 - SN1547; ConvF(6.20,6.20,6.20); Crest factor: 1.0; FCC Body\_898MHz:  $\sigma = 1.06$  mho/m  $\epsilon = 52.5$   $\rho = 1.00$  g/cm<sup>3</sup>; DAE3: 363-V1 DAE Cal Date: 08/22/01

Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 10.0,



## **APPENDIX B**

### **Dipole System Performance Check Results**

**SPEAG Dipole 835MHz. Test Date:03/20/02**

**Motorola CGISS EME Laboratory**

Model #: D835V2 SN: 427  
Run #: Sys Val\_R1\_020320-01  
Tissue Temp: 21.8 (Celsius)  
TX Freq: 835 MHz  
Start Power; 250mW

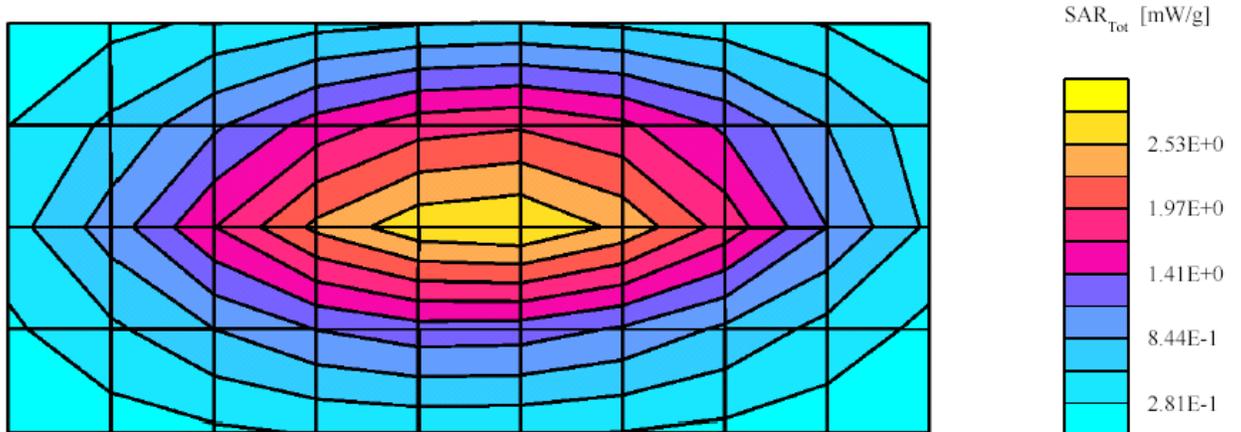
Target at 1W is 10.82  
SAR calculated is 10.74mW/g,  
Flat Phantom; Device

Probe: ET3DV6 - SN1547;Probe Cal Date: 11/16/01ConvF(6.20,6.20,6.20); Crest factor: 1.0; FCC Body\_835 MHz:  $\sigma = 0.99$   
mho/m  $\epsilon = 53.3$   $\rho = 1.00$  g/cm<sup>3</sup>; DAE3: SN363-V1 DAE Cal Date: 08/22/01

Cube 7x7x7: Peak: 4.25 mW/g, SAR (1g): 2.68 mW/g, SAR (10g): 1.71 mW/g, (Worst-case extrapolation)

Penetration depth: 12.3 (10.9, 14.1) [mm]

Power drift: 0.01 dB



**SPEAG Dipole 835MHz. Test Date:03/19/02**

**Motorola CGISS EME Lab**

Run #: Sys Val\_R1\_020319-01

Model #: D835V2 SN: 427

TX Freq: 835 MHz

Start Power; 250mW

Target at 1W is 10.82

SAR calculated is 10.54mW/g,

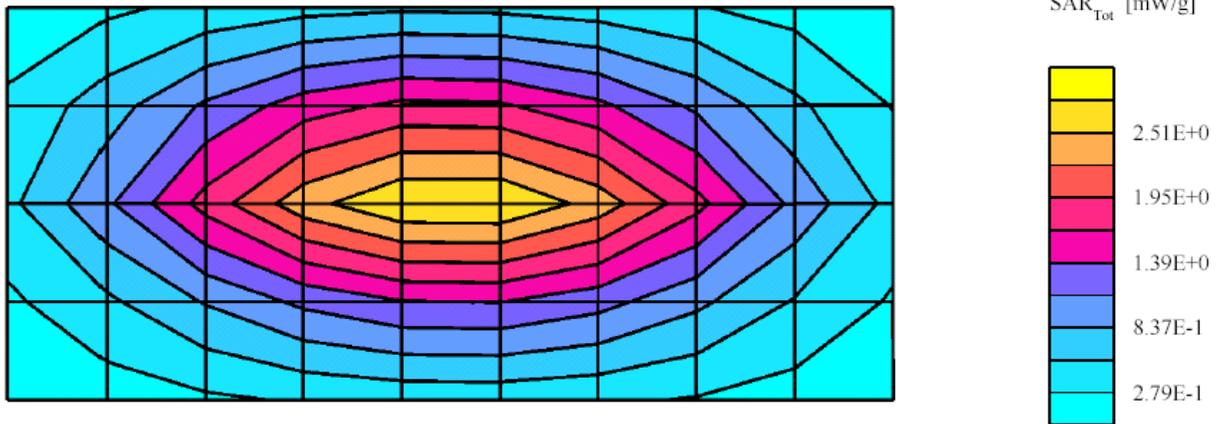
Flat Phantom; Probe: ET3DV6 - SN1547; Probe Cal Date: 11/16/01 ConvF(6.20,6.20,6.20); Crest factor: 1.0; FCC Body\_835

MHz:  $\sigma = 0.99$  mho/m  $\epsilon = 53.2$   $\rho = 1.00$  g/cm<sup>3</sup>; DAE3: SN363-V1 DAE Cal Date: 08/22/01

Cube 7x7x7; Peak: 4.17 mW/g, SAR (1g): 2.63 mW/g, SAR (10g): 1.68 mW/g, (Worst-case extrapolation)

Penetration depth: 12.2 (10.8, 14.0) [mm]

Power drift: -0.01 dB



**APPENDIX C**  
**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	ET3DV6
Serial Number:	1547
Place of Calibration:	Zurich
Date of Calibration:	November 16, 2001
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:

*N. E. N. N. N.*

Approved by

*J. K.*

ET3DV6 SN:1547

## DASY3 - Parameters of Probe: ET3DV6 SN:1547

### Sensitivity in Free Space

NormX	1.37 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.25 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.24 $\mu\text{V}/(\text{V}/\text{m})^2$

### Diode Compression

DCP X	92 mV
DCP Y	92 mV
DCP Z	92 mV

### Sensitivity in Tissue Simulating Liquid

Head                      450 MHz                       $\epsilon_r = 43.5 \pm 5\%$                        $\sigma = 0.87 \pm 10\%$  mho/m

ConvF X	6.86 extrapolated	Boundary effect:	
ConvF Y	6.86 extrapolated	Alpha	0.33
ConvF Z	6.86 extrapolated	Depth	2.54

Head                      800 - 1000 MHz                       $\epsilon_r = 39.0 - 43.5$                        $\sigma = 0.80 - 1.10$  mho/m

ConvF X	6.30 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.30 $\pm 9.5\%$ (k=2)	Alpha	0.41
ConvF Z	6.30 $\pm 9.5\%$ (k=2)	Depth	2.45

Head                      1500 MHz                       $\epsilon_r = 40.4 \pm 5\%$                        $\sigma = 1.23 \pm 10\%$  mho/m

ConvF X	5.54 interpolated	Boundary effect:	
ConvF Y	5.54 interpolated	Alpha	0.52
ConvF Z	5.54 interpolated	Depth	2.33

Head                      1700 - 1910 MHz                       $\epsilon_r = 39.5 - 41.0$                        $\sigma = 1.20 - 1.55$  mho/m

ConvF X	5.17 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	5.17 $\pm 9.5\%$ (k=2)	Alpha	0.57
ConvF Z	5.17 $\pm 9.5\%$ (k=2)	Depth	2.27

### Sensor Offset

Probe Tip to Sensor Center	2.7
Optical Surface Detection	1.4 $\pm$ 0.2

# 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:

1547

Place of Assessment:

Zurich

Date of Assessment:

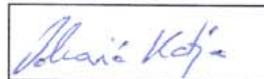
November 17, 2001

Probe Calibration Date:

November 16, 2001

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:1547

Conversion factor ( $\pm$  standard deviation)

150 MHz	ConvF	7.9 $\pm$ 8%	$\epsilon_r = 61.9$ $\sigma = 0.80$ mho/m (muscle tissue)
236 MHz	ConvF	7.7 $\pm$ 8%	$\epsilon_r = 59.8$ $\sigma = 0.87$ mho/m (muscle tissue)
300 MHz	ConvF	7.6 $\pm$ 8%	$\epsilon_r = 58.2$ $\sigma = 0.92$ mho/m (muscle tissue)
350 MHz	ConvF	7.4 $\pm$ 8%	$\epsilon_r = 57.7$ $\sigma = 0.93$ mho/m (muscle tissue)
450 MHz	ConvF	7.2 $\pm$ 8%	$\epsilon_r = 56.7$ $\sigma = 0.94$ mho/m (muscle tissue)
784 MHz	ConvF	6.3 $\pm$ 8%	$\epsilon_r = 55.4$ $\sigma = 0.97$ mho/m (muscle tissue)
835 MHz	ConvF	6.2 $\pm$ 8%	$\epsilon_r = 55.2$ $\sigma = 0.97$ mho/m (muscle tissue)
925 MHz	ConvF	6.0 $\pm$ 8%	$\epsilon_r = 55.0$ $\sigma = 1.06$ mho/m (muscle tissue)
1450 MHz	ConvF	5.5 $\pm$ 8%	$\epsilon_r = 54.0$ $\sigma = 1.30$ mho/m (muscle tissue)
1900 MHz	ConvF	4.8 $\pm$ 8%	$\epsilon_r = 53.3$ $\sigma = 1.52$ mho/m (muscle tissue)
2450 MHz	ConvF	4.0 $\pm$ 8%	$\epsilon_r = 52.7$ $\sigma = 1.95$ mho/m (muscle tissue)

## Dosimetric E-Field Probe ET3DV6 SN:1547

Conversion factor ( $\pm$  standard deviation)

150 MHz	ConvF	8.6 $\pm$ 8%	$\epsilon_r = 52.3$ $\sigma = 0.76$ mho/m (head tissue)
236 MHz	ConvF	7.8 $\pm$ 8%	$\epsilon_r = 48.3$ $\sigma = 0.82$ mho/m (head tissue)
300 MHz	ConvF	7.4 $\pm$ 8%	$\epsilon_r = 45.3$ $\sigma = 0.87$ mho/m (head tissue)
350 MHz	ConvF	7.3 $\pm$ 8%	$\epsilon_r = 44.7$ $\sigma = 0.87$ mho/m (head tissue)
400 MHz	ConvF	7.2 $\pm$ 8%	$\epsilon_r = 44.4$ $\sigma = 0.87$ mho/m (head tissue - CENELEC)
450 MHz	ConvF	7.1 $\pm$ 8%	$\epsilon_r = 43.5$ $\sigma = 0.87$ mho/m (head tissue)
784 MHz	ConvF	6.5 $\pm$ 8%	$\epsilon_r = 41.8$ $\sigma = 0.90$ mho/m (head tissue)
835 MHz	ConvF	6.4 $\pm$ 8%	$\epsilon_r = 41.5$ $\sigma = 0.90$ mho/m (head tissue)
835 MHz	ConvF	6.4 $\pm$ 8%	$\epsilon_r = 42.5$ $\sigma = 0.98$ mho/m (head tissue - CENELEC)
925 MHz	ConvF	6.2 $\pm$ 8%	$\epsilon_r = 41.5$ $\sigma = 0.98$ mho/m (head tissue)
900 MHz	ConvF	6.3 $\pm$ 8%	$\epsilon_r = 42.3$ $\sigma = 0.99$ mho/m (head tissue - CENELEC)

**Dosimetric E-Field Probe ET3DV6 SN:1547**

Conversion factor ( $\pm$  standard deviation)

<b>1500 MHz</b>	ConvF	<b>5.8 <math>\pm</math> 8%</b>	$\epsilon_r = 40.4$ $\sigma = 1.23$ mho/m (head tissue)
<b>1900 MHz</b>	ConvF	<b>5.2 <math>\pm</math> 8%</b>	$\epsilon_r = 40.0$ $\sigma = 1.40$ mho/m (head tissue)
<b>2450 MHz</b>	ConvF	<b>4.4 <math>\pm</math> 8%</b>	$\epsilon_r = 39.2$ $\sigma = 1.80$ mho/m (head tissue)

# Schmid & Partner Engineering AG

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## Calibration Certificate

### 835 MHz System Validation Dipole

Type:

D835V2

Serial Number:

427

Place of Calibration:

Zurich

Date of Calibration:

Nov. 2, 2000

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:

Nikolaus Neumann

Approved by:

Johann Klatt

**SYSTEM PERFORMANCE CHECK TARGET SAR**

Date: 2/12/2002 Frequency (MHz): 835  
Lab Location: CGISS Mixture Type: FCC Body  
Robot System: CGISS 1 Ambient Temp.(°C): 22  
Probe Serial #: 1547 Tissue Temp.(°C): 20.5  
DAE Serial #: 363

**Tissue Characteristics**

Permittivity: 52.6 Phantom Type/SN: 80302002A  
Conductivity: 1.00 Distance (mm): 15

Reference Source: D835V2 (Dipole)  
Reference SN: 427

Power to Dipole: 250 mW

Measured SAR Value: 2.7 mW/g, 1.72 mW/g (10g avg.)  
Power Drift: -0.01 dB

**New Target/Measured**

SAR Value: 10.82 mW/g, 6.90 mW/g (10g avg.)  
(normalized to 1.0 W, including drift)

Test performed by: Stephen C. Whalen Initial: SCW 2/27/02

**SYSTEM VALIDATION**

Date: 2/12/02 Frequency (MHz): 835  
Lab Location: CGISS Mixture Type: IEEE Head  
Robot System: CGISS-1 Ambient Temp.(°C): 22  
Probe Serial #: 1547 Tissue Temp. (°C): 21.0  
DAE Serial #: 363

Tissue Characteristics Phantom Type/SN: ACL40232002A  
Permittivity: 40.2 Distance: 15mm  
Conductivity: 0.89

Reference Source: D835V2 (Dipole/Handset)  
Reference SN: 427

Power to Dipole: 250 mW  
Power Output (radio): N/A mW

Target SAR Value: 9.5 mW/g, 6.2 mW/g (10g avg.)  
(normalized to 1.0 W)

Measured SAR Value: 2.43 mW/g, 1.55 mW/g (10g avg.)  
Power Drift: -01 dB

Measured SAR Value: 9.74 mW/g, 6.21 mW/g (10g avg.)  
(normalized to 1.0 W,  
with drift compensation)

Percent Difference From Target (must be within System Uncertainty): 2.5 % (1g avg)  
0.2 % (10g avg)

Test performed by: Stephen Whalen Initial: SW 2/12/02

## APPENDIX D: Illustration of Body-Worn Accessories

The purpose of this appendix is to illustrate the new body-worn carry accessories and new user position for the device model F5027A. The device depicted in the following photos represents the device used to obtain the results presented herein and was used solely to demonstrate the different body-worn carry case accessories.



**Photo 1.**  
Model F5027A  
Back View in  
ABF960 case



**Photo 2.**  
Model F5027A  
Front view in  
ABF960 case



**Photo 3.**  
Model F5027A in  
ABF960  
Side view



**Photo 4.**  
Back view of  
ABF960 case



**Photo 5.**  
Model F5027A  
In ABF960  
User position  
Front to body



**Photo 6.**  
Model F5027A  
In ABF960  
User position  
Back to body



**Photo 7.**  
Model F5027A  
Shirt pocket  
User position  
Front to body



**Photo 8.**  
Model F5027A  
Shirt pocket  
User position  
Back to body

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

<b>Carry Case Model</b>	<b>Separation distance between device and phantom surface. (mm)</b>
ABF960	4@ loop/ 2 elsewhere