
	Date(s) of Evaluation September 06, 2006	Test Report Serial No. 090106AL8-T771-S15R	Report Revision No. Revision 1.0	
	Report Issue Date September 13, 2006	Description of Test(s) Specific Absorption Rate	RF Exposure Category General Population	

Date Tested: 09/06/2006

### Body-Worn SAR - Left Belt-Clip Side of DUT with H251 Headset - 1924.992 MHz - Mid Channel

DUT: Plantronics Inc. Model: CA12CD; Type: Wireless Headset Adaptor (Remote Unit with PTT); Serial: 230

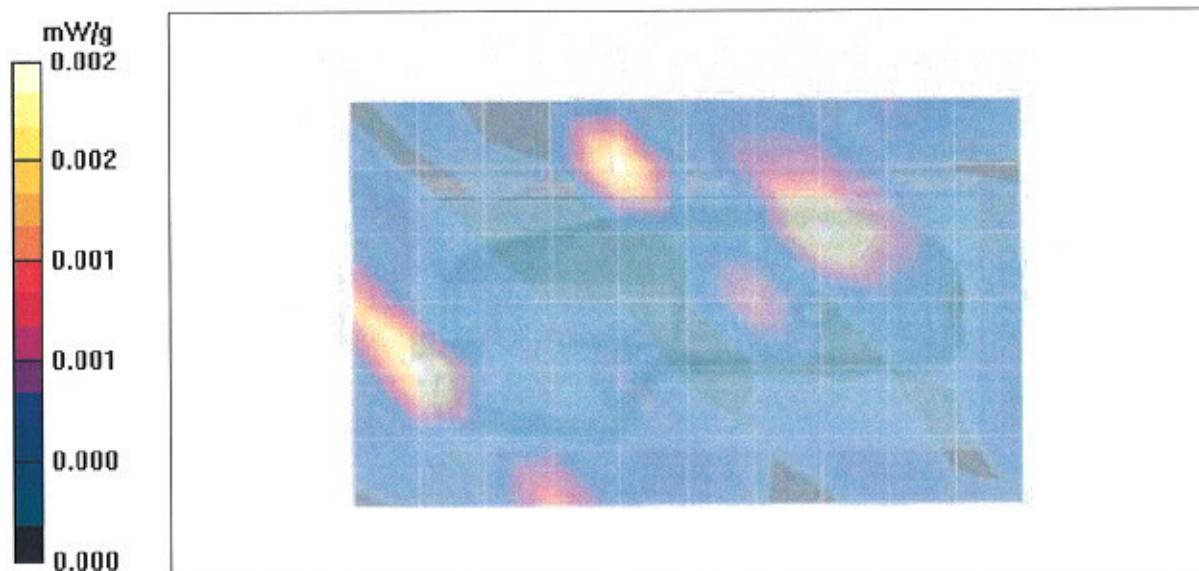
Body-Worn Accessory: Integrated Metal Belt-Clip; Audio Accessory: Plantronics Supraplus Headset (H251)


Ambient Temp: 24.2°C; Fluid Temp: 23.8°C; Barometric Pressure: 101.2 kPa; Humidity: 33%



Communication System: TDMA/TDD  
 Lithium-ion Battery (3.8 V, 190 mAh)  
 RF Output Power: 1.7 dBm (Conducted)  
 Frequency: 1924.992 MHz; Duty Cycle: 1:12.05  
 Medium: MSL1920 ( $\sigma = 1.50 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  $\rho = 1000 \text{ kg/m}^3$ )

- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-Worn SAR - Left Belt-Clip Side of DUT Touching Planar Phantom (3 mm Belt-Clip Spacing) - Mid Channel  
 Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm  
 Maximum Peak Value of SAR (measured) = 0.002 mW/g



Company:	Plantronics Inc.	FCC ID:	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Remote)	Device:	Wireless Headset Adaptor (Remote Unit with PTT)		
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	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15R	<u>Report Revision No.</u> Revision 1.0	
	<u>Report Issue Date</u> September 13, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 09/06/2006

**Body-Worn SAR - Right Belt-Clip Side of DUT with H251 Headset - 1924.992 MHz - Mid Channel**

DUT: Plantronics Inc. Model: CA12CD; Type: Wireless Headset Adaptor (Remote Unit with PTT); Serial: 230

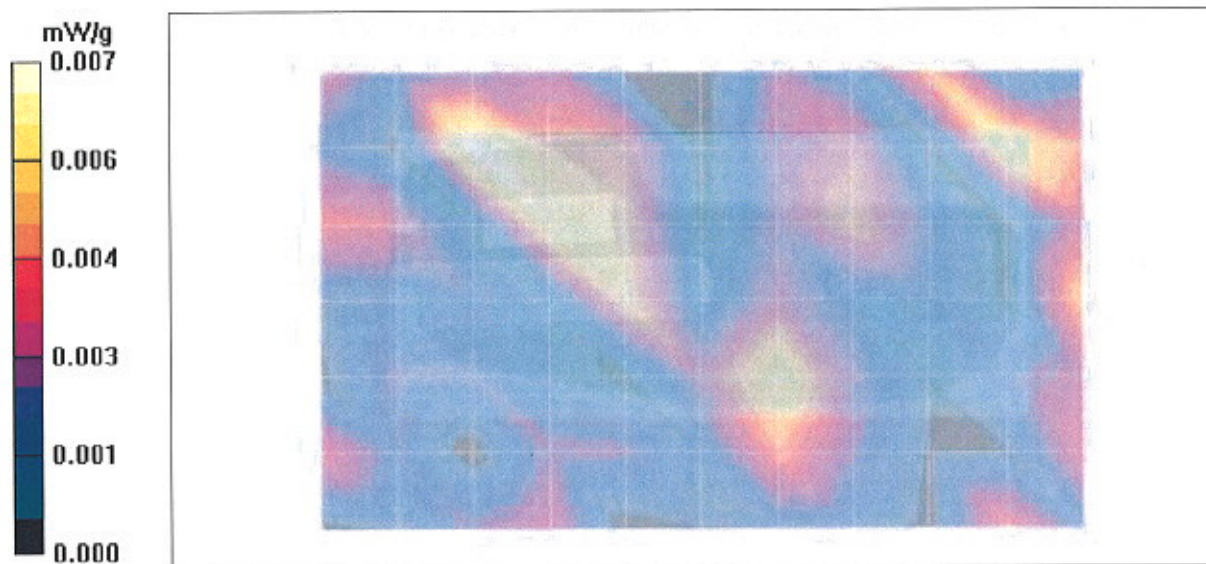
Body-Worn Accessory: Integrated Metal Belt-Clip; Audio Accessory: Plantronics Supraplus Headset (H251)


Ambient Temp: 24.2°C; Fluid Temp: 23.8°C; Barometric Pressure: 101.2 kPa; Humidity: 33%

Communication System: TDMA/TDD  
 Lithium-ion Battery (3.8 V, 190 mAh)  
 RF Output Power: 1.7 dBm (Conducted)  
 Frequency: 1924.992 MHz; Duty Cycle: 1:12.05  
 Medium: MSL1920 ( $\sigma = 1.50 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  $\rho = 1000 \text{ kg/m}^3$ )



- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

**Body-Worn SAR - Right Belt-Clip Side of DUT Touching Planar Phantom (3 mm Belt-Clip Spacing) - Mid Channel**  
 Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm  
 Maximum Peak Value of SAR (measured) = 0.007 mW/g



Company:	Plantronics Inc.	FCC ID:	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Remote)	Device:	Wireless Headset Adaptor (Remote Unit with PTT)		
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	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15R	<u>Report Revision No.</u> Revision 1.0	
	<u>Report Issue Date</u> September 13, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 09/06/2006

**Body-Worn SAR - Right Belt-Clip Side of DUT with H91 Headset - 1924.992 MHz - Mid Channel**

DUT: Plantronics Inc. Model: CA12CD; Type: Wireless Headset Adaptor (Remote Unit with PTT); Serial: 230

Body-Worn Accessory: Integrated Metal Belt-Clip; Audio Accessory: Plantronics Monaural Ultra Headset (H91)

Ambient Temp: 24.2°C; Fluid Temp: 23.8°C; Barometric Pressure: 101.2 kPa; Humidity: 33%

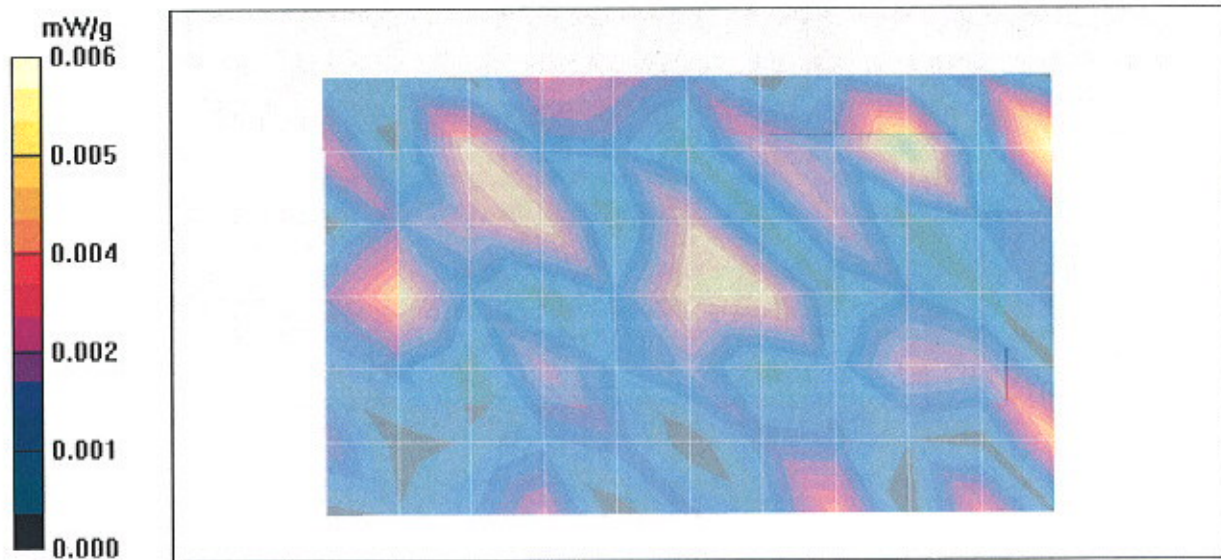
Communication System: TDMA/TDD  
 Lithium-ion Battery (3.8 V, 190 mAh)  
 RF Output Power: 1.7 dBm (Conducted)  
 Frequency: 1924.992 MHz; Duty Cycle: 1:12.05  
 Medium: MSL1920 ( $\sigma = 1.50 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  $\rho = 1000 \text{ kg/m}^3$ )


- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171



**Body-Worn SAR - Right Belt-Clip Side of DUT Touching Planar Phantom (3 mm Belt-Clip Spacing) - Mid Channel**

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum Peak Value of SAR (measured) = 0.006 mW/g



<b>Company:</b>	Plantronics Inc.	<b>FCC ID:</b>	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
<b>Model(s):</b>	CA12CD (Remote)	<b>Device:</b>	Wireless Headset Adaptor (Remote Unit with PTT)		
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	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15R	<u>Report Revision No.</u> Revision 1.0	
	<u>Report Issue Date</u> September 13, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 09/06/2006

**Body-Worn SAR - Right Belt-Clip Side of DUT with H51/A Headset - 1924.992 MHz - Mid Channel**

DUT: Plantronics Inc. Model: CA12CD; Type: Wireless Headset Adaptor (Remote Unit with PTT); Serial: 230

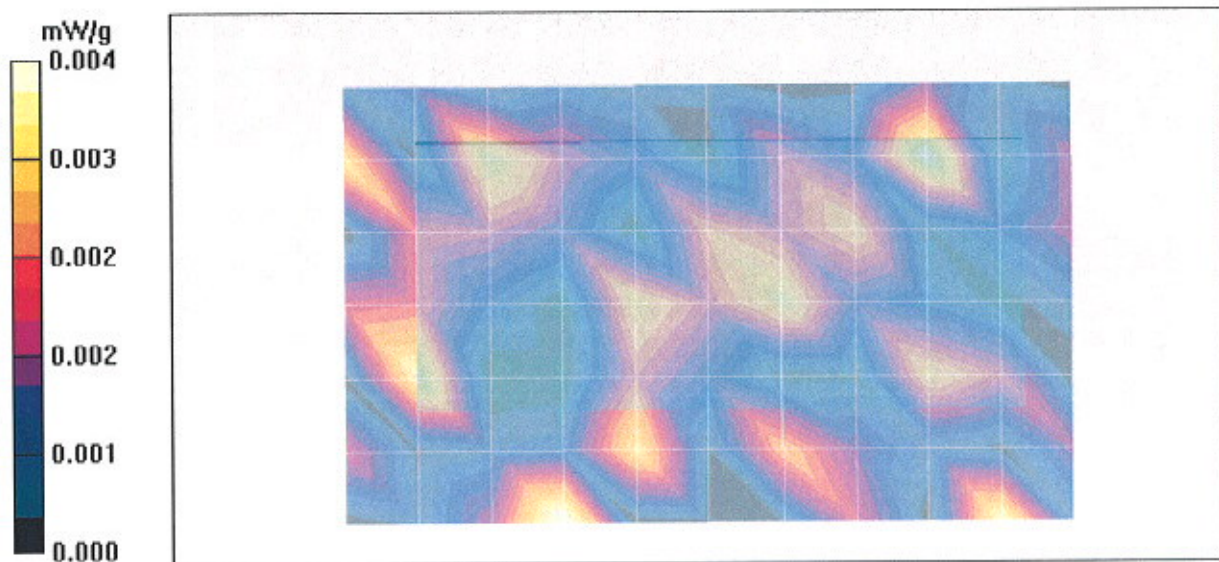
Body-Worn Accessory: Integrated Metal Belt-Clip; Audio Accessory: Plantronics Supra Monaural Headset (H51/A)


Ambient Temp: 24.2°C; Fluid Temp: 23.8°C; Barometric Pressure: 101.2 kPa; Humidity: 33%

Communication System: TDM/VTDD  
 Lithium-ion Battery (3.8 V, 190 mAh)  
 RF Output Power: 1.7 dBm (Conducted)  
 Frequency: 1924.992 MHz; Duty Cycle: 1:12.05  
 Medium: MSL1920 ( $\sigma = 1.50$  mho/m;  $\epsilon_r = 51.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>)



- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

**Body-Worn SAR - Right Belt-Clip Side of DUT Touching Planar Phantom (3 mm Belt-Clip Spacing) - Mid Channel**  
 Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm  
 Maximum Peak Value of SAR (measured) = 0.004 mW/g

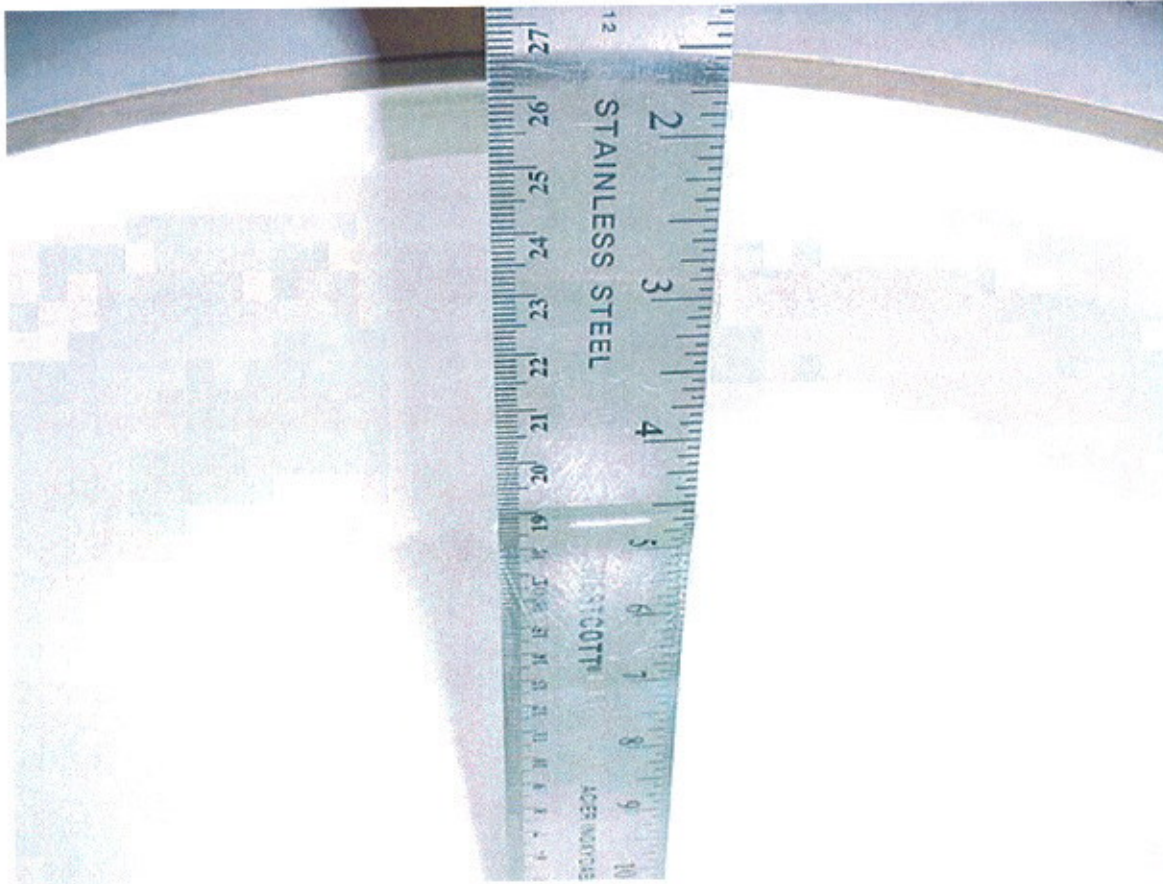



Company:	Plantronics Inc.	FCC ID:	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Remote)	Device:	Wireless Headset Adaptor (Remote Unit with PTT)		
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	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15R	<u>Report Revision No.</u> Revision 1.0	 Certificate No. 2470.01
	<u>Report Issue Date</u> September 13, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	


**Fluid Depth (>15cm)**





<b>Company:</b>	Plantronics Inc.	<b>FCC ID:</b>	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
<b>Model(s):</b>	CA12CD (Remote)	<b>Device:</b>	Wireless Headset Adaptor (Remote Unit with PTT)		
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	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15R	<u>Report Revision No.</u> Revision 1.0	 Certificate No. 2470.01
	<u>Report Issue Date</u> September 13, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**APPENDIX B - SYSTEM PERFORMANCE CHECK DATA**

<b>Company:</b>	Plantronics Inc.	<b>FCC ID:</b>	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
<b>Model(s):</b>	CA12CD (Remote)	<b>Device:</b>	Wireless Headset Adaptor (Remote Unit with PTT)		
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	Date(s) of Evaluation September 06, 2006	Test Report Serial No. 090106AL8-T771-S15R	Report Revision No. Revision 1.0	
	Report Issue Date September 13, 2006	Description of Test(s) Specific Absorption Rate	RF Exposure Category General Population	

Date Tested: 09/06/2006

### System Performance Check (Body) - 1900 MHz Dipole

DUT: Dipole 1900 MHz; Model: D1900V2; Serial: 151; Validation: 06/12/2006

Ambient Temp: 24.2°C; Fluid Temp: 23.8°C; Barometric Pressure: 101.2 kPa; Humidity: 33%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL1900 Medium ( $\sigma = 1.49$  mho/m;  $\epsilon_r = 51.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>)

- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

#### 1900 MHz Dipole - System Performance Check/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

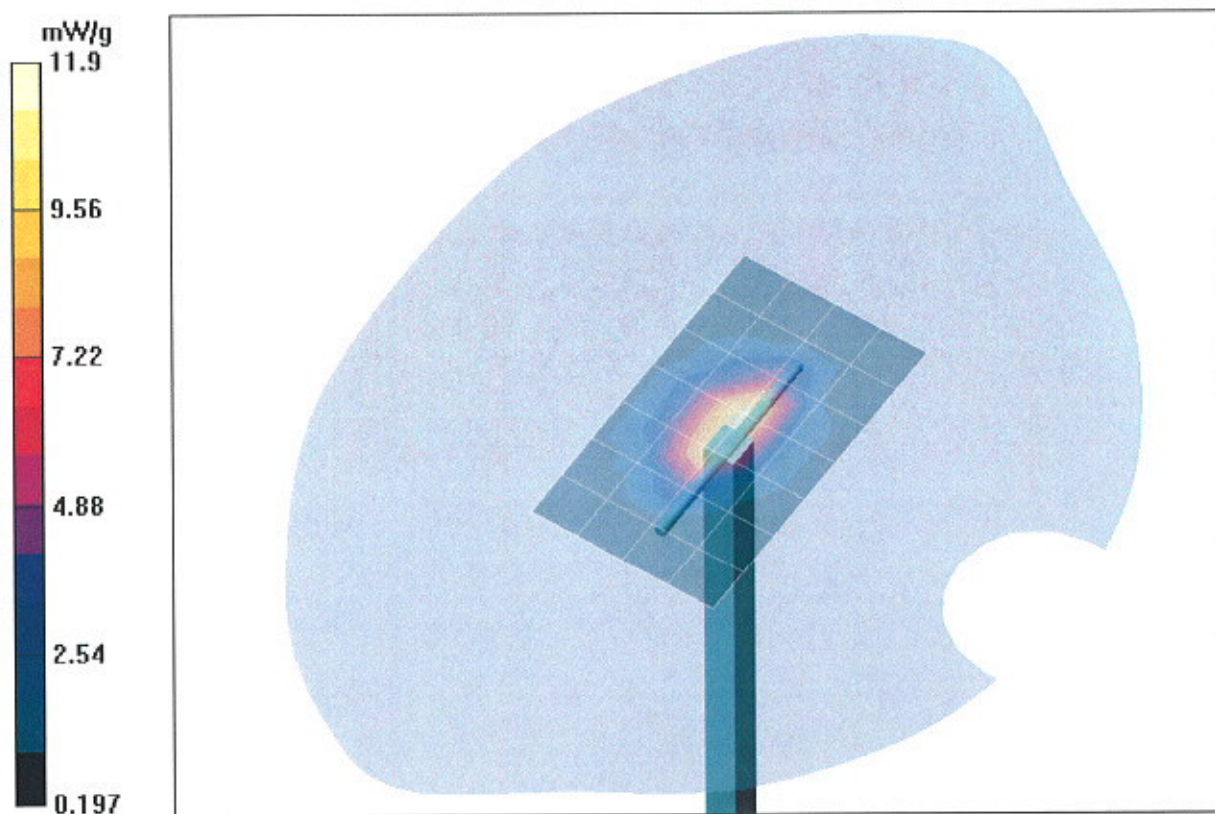
#### 1900 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:


Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.0 V/m; Power Drift = -0.026 dB

Peak SAR (extrapolated) = 24.2 W/kg

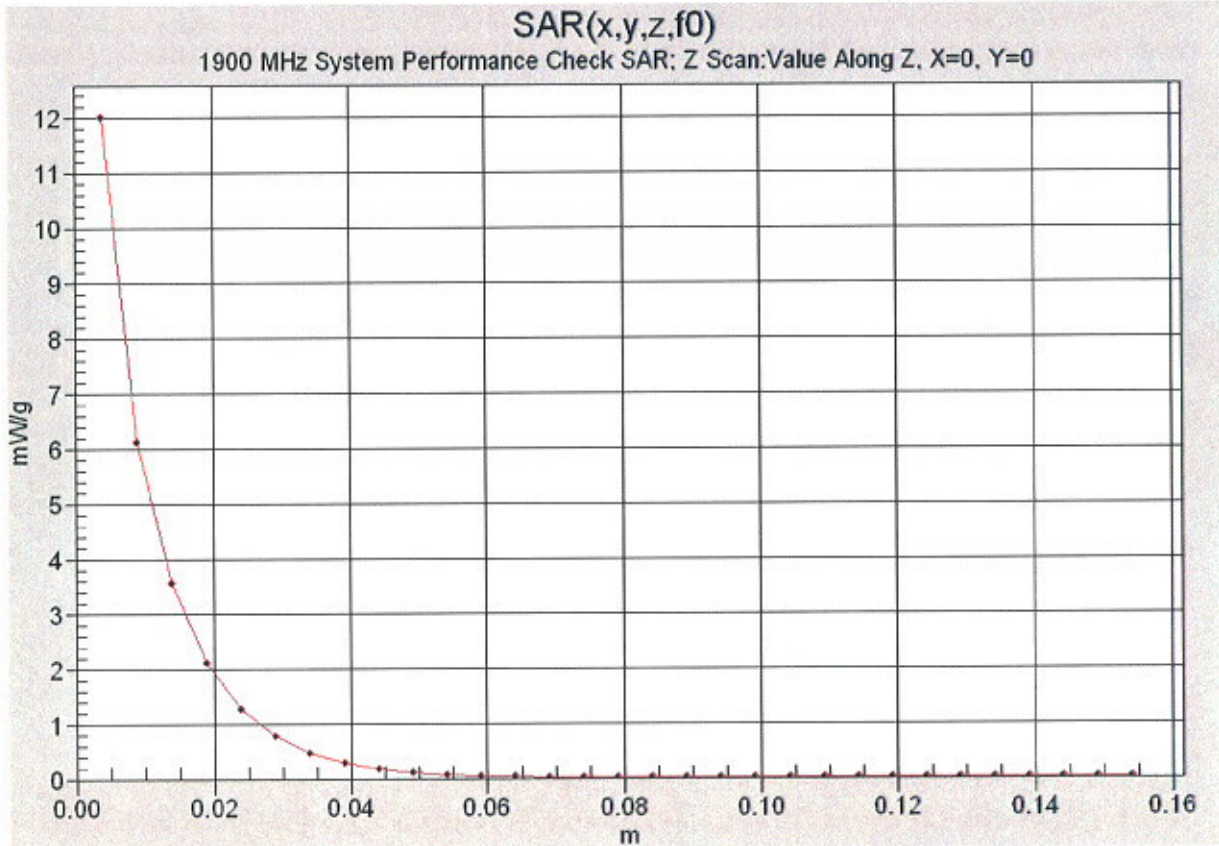
SAR(1 g) = 10.9 mW/g; SAR(10 g) = 5.42 mW/g





Company:	Plantronics Inc.	FCC ID:	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Remote)	Device:	Wireless Headset Adaptor (Remote Unit with PTT)		
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**Z-Axis Scan**







	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15R	<u>Report Revision No.</u> Revision 1.0	 Certificate No. 2470.01
	<u>Report Issue Date</u> September 13, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

## APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

<b>Company:</b>	Plantronics Inc.	<b>FCC ID:</b>	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
<b>Model(s):</b>	CA12CD (Remote)	<b>Device:</b>	Wireless Headset Adaptor (Remote Unit with PTT)		
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	Date(s) of Evaluation September 06, 2006	Test Report Serial No. 090106AL8-T771-S15R	Report Revision No. Revision 1.0	
	Report Issue Date September 13, 2006	Description of Test(s) Specific Absorption Rate	RF Exposure Category General Population	


### 1900 MHz System Performance Check & 1920 MHz DUT Evaluation (Body)

\*\*\*\*\*



Celltech Labs Inc.  
 Test Result for UIM Dielectric Parameter  
 Wed 06/Sep/2006  
 Frequency (GHz)  
 FCC\_eH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon  
 FCC\_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma  
 FCC\_eB FCC Limits for Body Epsilon  
 FCC\_sB FCC Limits for Body Sigma  
 Test\_e Epsilon of UIM  
 Test\_s Sigma of UIM

\*\*\*\*\*


Freq	FCC_eB	FCC_sB	Test_e	Test_s
1.8000	53.30	1.52	51.86	1.40
1.8100	53.30	1.52	51.99	1.41
1.8200	53.30	1.52	51.85	1.41
1.8300	53.30	1.52	51.82	1.41
1.8400	53.30	1.52	51.66	1.42
1.8500	53.30	1.52	51.56	1.44
1.8600	53.30	1.52	51.62	1.44
1.8700	53.30	1.52	51.57	1.45
1.8800	53.30	1.52	51.50	1.47
1.8900	53.30	1.52	51.42	1.48
1.9000	53.30	1.52	51.50	1.49
1.9100	53.30	1.52	51.47	1.50
1.9200	53.30	1.52	51.60	1.50
1.9300	53.30	1.52	51.52	1.53
1.9400	53.30	1.52	51.40	1.53
1.9500	53.30	1.52	51.40	1.53
1.9600	53.30	1.52	51.45	1.55
1.9700	53.30	1.52	51.34	1.56
1.9800	53.30	1.52	51.26	1.58
1.9900	53.30	1.52	51.15	1.59
2.0000	53.30	1.52	51.30	1.61



Company:	Plantronics Inc.	FCC ID:	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Remote)	Device:	Wireless Headset Adaptor (Remote Unit with PTT)		
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	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15R	<u>Report Revision No.</u> Revision 1.0	 Certificate No. 2470.01
	<u>Report Issue Date</u> September 13, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS**

<b>Company:</b>	Plantronics Inc.	<b>FCC ID:</b>	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
<b>Model(s):</b>	CA12CD (Remote)	<b>Device:</b>	Wireless Headset Adaptor (Remote Unit with PTT)		
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	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15R	<u>Report Revision No.</u> Revision 1.0	
	<u>Report Issue Date</u> September 13, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**APPENDIX E - SYSTEM VALIDATION**

<b>Company:</b> Plantronics Inc.	<b>FCC ID:</b> AL8CA12CDYYYY	<b>1921.536 - 1928.448 MHz</b>	
<b>Model(s):</b> CA12CD (Remote)	<b>Device:</b> Wireless Headset Adaptor (Remote Unit with PTT)		
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Date of Evaluation:	June 12, 2006	Document Issue No.:	SV1900B-061206-R1.0
Evaluation Type:	System Validation	Validation Dipole:	1900 MHz Body

## 1900 MHz SYSTEM VALIDATION

Type:

**1900 MHz Validation Dipole**

Asset Number:

**00032**

Serial Number:

**151**

Place of Validation:

**Celltech Labs Inc.**

Date of Validation:

**June 12, 2006**

Celltech Labs Inc. certifies that the 1900 MHz System Validation (Body) was performed on the date indicated above.

Performed by:

**Sean Johnston**

Approved by:

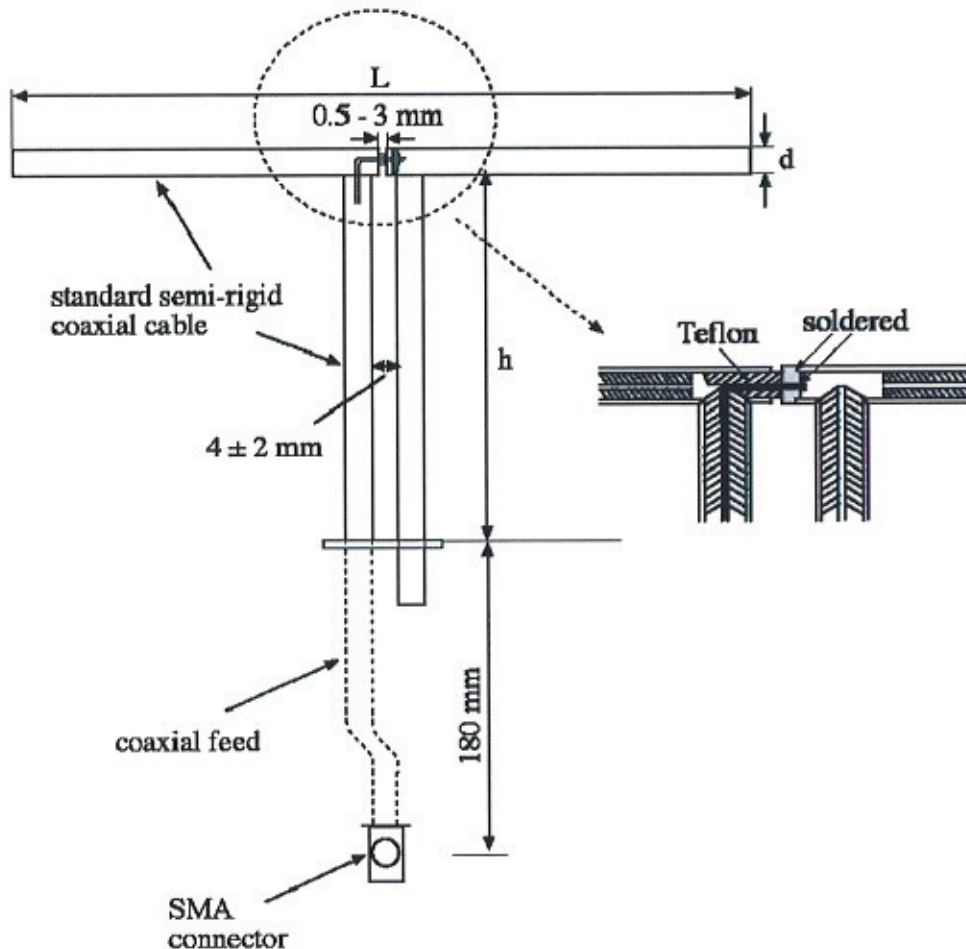
**Spencer Watson**

## 1. Dipole Construction & Electrical Characteristics

The validation dipole was constructed in accordance with the IEEE Standard "Annex G (informative) Reference dipoles for use in system validation". The electrical properties were measured using an HP 8753ET Network Analyzer. The network analyzer was calibrated to the validation dipole N-type connector feed point using an HP85032E Type N calibration kit. The dipole was placed parallel to a planar phantom at a separation distance of 10.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

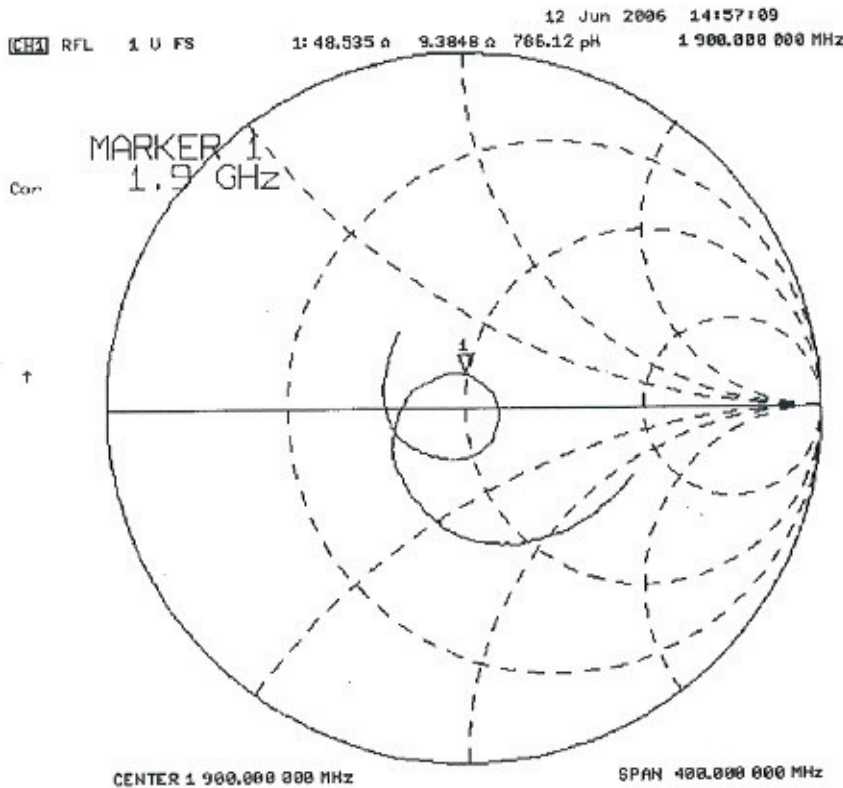
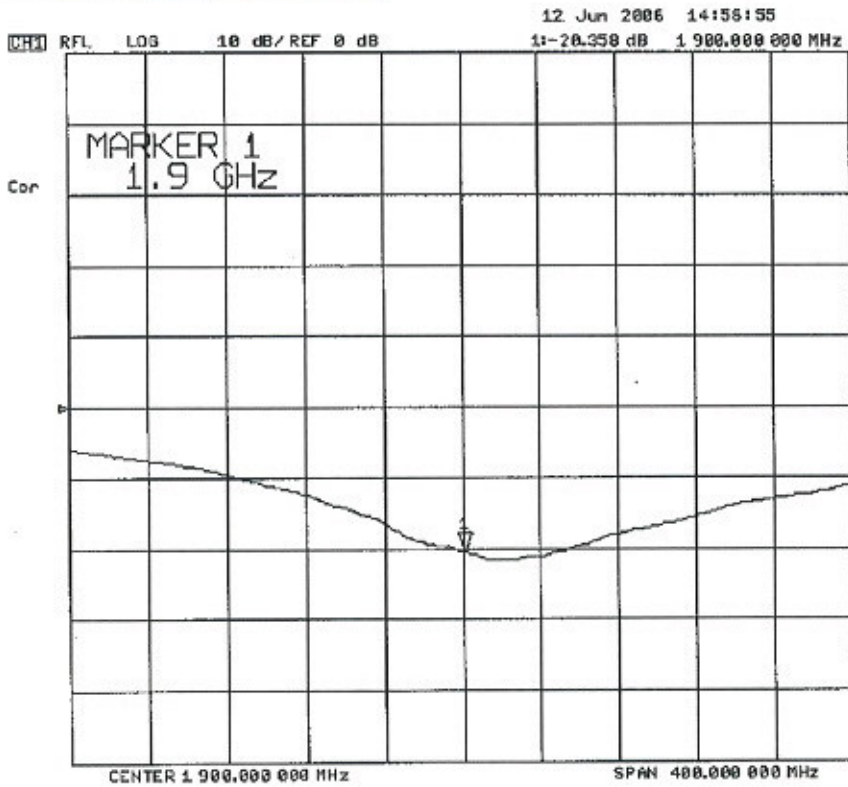
Feed point impedance at 1900MHz       $\text{Re}\{Z\} = 48.535\Omega$   
 $\text{Im}\{Z\} = 9.3848\Omega$

Return Loss at 1900MHz                      -20.358dB





## 2. Validation Dipole VSWR Data



### 3. Validation Dipole Dimensions

Frequency (MHz)	L (mm)	h (mm)	d (mm)
300	420.0	250.0	6.2
450	288.0	167.0	6.2
835	161.0	89.8	3.6
900	149.0	83.3	3.6
1450	89.1	51.7	3.6
1800	72.0	41.7	3.6
1900	68.0	39.5	3.6
2000	64.5	37.5	3.6
2450	51.8	30.6	3.6
3000	41.5	25.0	3.6

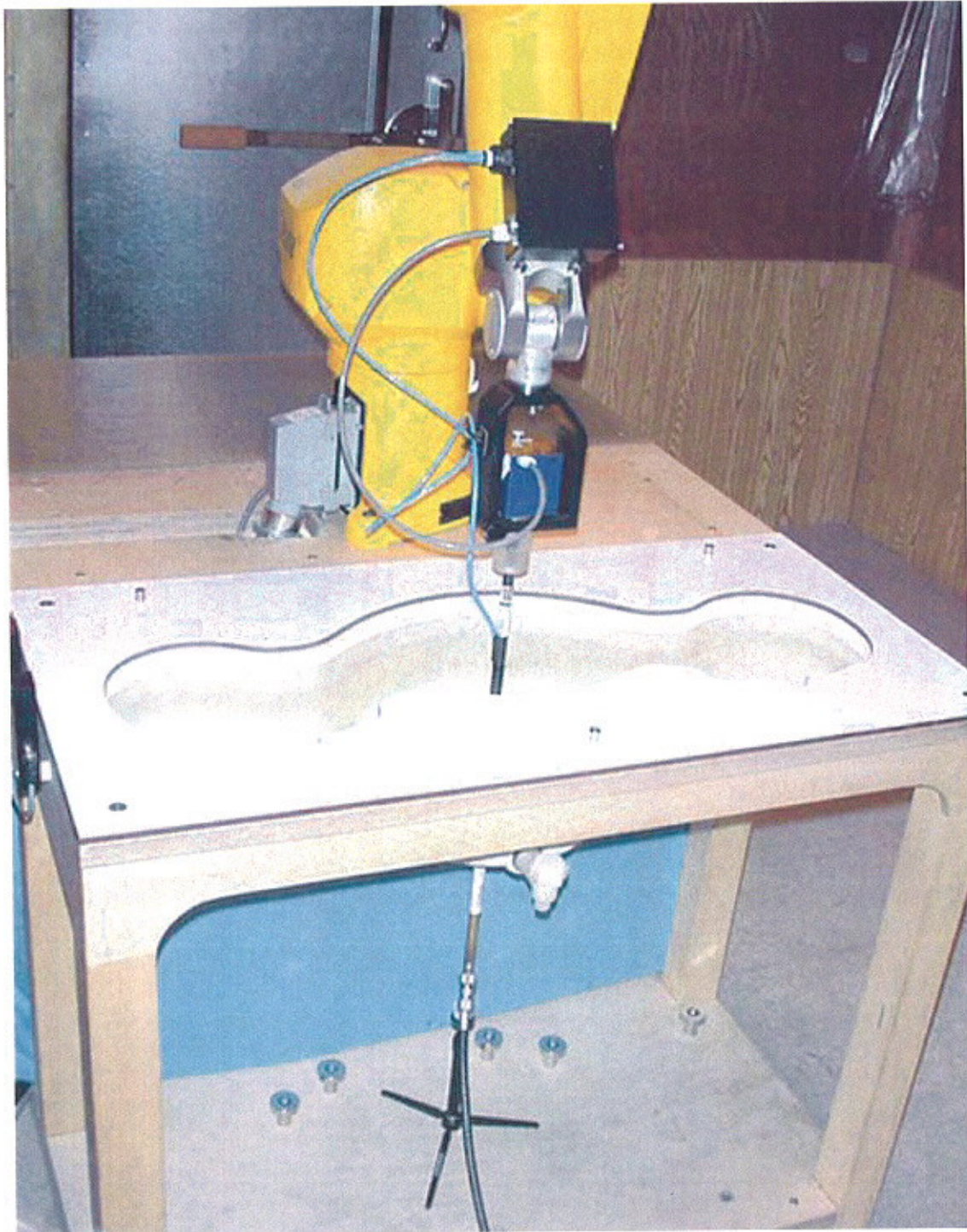
### 4. Validation Phantom

The validation phantom is the SAM (Specific Anthropomorphic Mannequin) phantom manufactured by Schmid & Partner Engineering AG. The SAM phantom is a Fiberglass shell integrated in a wooden table. The shape of the shell corresponds to the phantom defined by SCC34-SC2. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

**Shell Thickness:** 2.0 ± 0.1 mm  
**Filling Volume:** Approx. 25 liters  
**Dimensions:** 50 cm (W) x 100 cm (L)



## 5. 1900 MHz System Validation Setup






	Date of Evaluation:	June 12, 2006	Document Issue No.:	SV1900B-061206-R1.0	
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Body

## 6. 1900 MHz Dipole Setup



	Date of Evaluation:	June 12, 2006	Document Issue No.:	SV1900B-061206-R1.0	
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Body

## 7. Measurement Conditions

The phantom was filled with 1900 MHz Body tissue simulant.

Relative Permittivity: 51.4 (-3.5% deviation from target)  
 Conductivity: 1.51 mho/m (-0.5% deviation from target)  
 Fluid Temperature: 23.5 °C  
 Fluid Depth: ≥ 15.0 cm

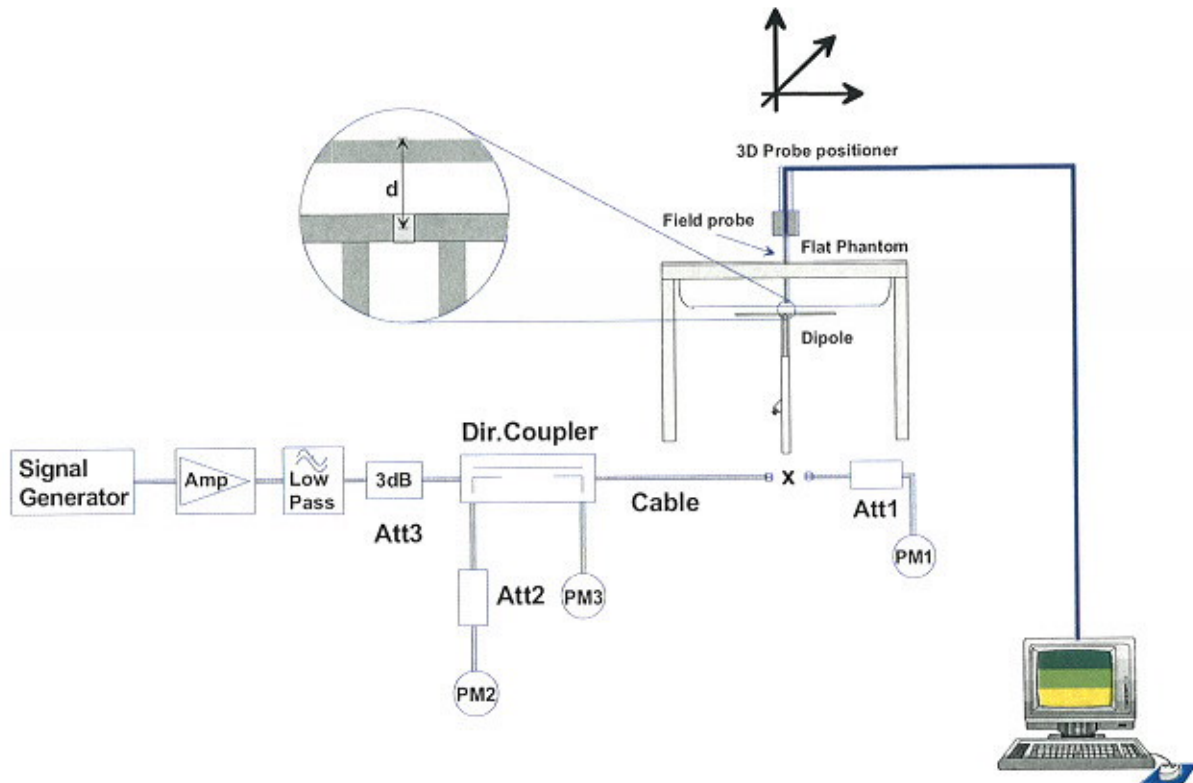
Environmental Conditions:  
 Ambient Temperature: 23.2 °C  
 Barometric Pressure: 101.2 kPa  
 Humidity: 44%

The 1900 MHz Body tissue simulant consisted of the following ingredients:

Ingredient	Percentage by weight
Water	69.85%
Glycol	29.89%
Salt	0.26%
Target Dielectric Parameters at 25 °C	$\epsilon_r = 53.3 (+/-5\%)$ $\sigma = 1.52 \text{ S/m } (+/-5\%)$

## 8. SAR Measurement

The SAR measurement was performed with the E-field probe in mechanical detection mode only. The setup and determination of the forward power into the dipole was performed using the following procedures.



First the power meter PM1 (including attenuator Att1) is connected to the cable to measure the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the attenuation of Att1) as read by power meter PM2. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. If the signal generator does not allow adjustment in 0.01dB steps, the remaining difference at PM2 must be taken into consideration. PM3 records the reflected power from the dipole to ensure that the value is not changed from the previous value. The reflected power should be 50dB below the forward power.



## 9. Validation Dipole SAR Test Results

Ten SAR measurements were performed in order to achieve repeatability and to establish an average target value.

Validation Measurement	SAR @ 0.25W Input averaged over 1g	SAR @ 1W Input averaged over 1g	SAR @ 0.25W Input averaged over 10g	SAR @ 1W Input averaged over 10g	Peak SAR @ 0.25W Input
Test 1	10.50	42.00	5.40	21.60	11.90
Test 2	10.40	41.60	5.37	21.48	11.80
Test 3	10.40	41.60	5.37	21.48	11.80
Test 4	10.60	42.40	5.47	21.88	12.00
Test 5	10.30	41.20	5.30	21.20	11.60
Test 6	10.20	40.80	5.28	21.12	11.60
Test 7	10.20	40.80	5.27	21.08	11.60
Test 8	10.30	41.20	5.34	21.36	11.70
Test 9	10.30	41.20	5.31	21.24	11.60
Test 10	10.30	41.20	5.32	21.28	11.70
<b>Average</b>	<b>10.35</b>	<b>41.40</b>	<b>5.34</b>	<b>21.37</b>	<b>11.73</b>

The results have been normalized to 1W (forward power) into the dipole.

Target SAR @ 1 Watt Input averaged over 1 gram (W/kg)	Measured SAR @ 1 Watt Input averaged over 1 gram (W/kg)	Deviation from Target (%)	Target SAR @ 1 Watt Input averaged over 10 grams (W/kg)	Measured SAR @ 1 Watt Input averaged over 10 grams (W/kg)	Deviation from Target (%)		
39.8	+/- 10%	41.40	+4.02	20.8	+/- 10%	21.37	+2.74

Dipole Type	Distance [mm]	Frequency [MHz]	SAR (1g) [W/kg]	SAR (10g) [W/kg]	SAR (peak) [W/kg]
D300V2	15	300	3.02	2.06	4.36
D450V2	15	450	5.01	3.36	7.22
D835V2	15	835	9.71	6.38	14.1
D900V2	15	900	11.1	7.17	16.3
D1450V2	10	1450	29.6	16.6	49.8
D1500V2	10	1500	30.8	17.1	52.1
D1640V2	10	1640	34.4	18.7	59.4
D1800V2	10	1800	38.5	20.3	67.5
D1900V2	10	1900	39.8	20.8	69.6
D2000V2	10	2000	40.9	21.2	71.5
D2450V2	10	2450	51.2	23.7	97.6
D3000V2	10	3000	61.9	24.8	136.7

Table 32.1: Numerical reference SAR values for SPEAG dipoles and flat phantom filled with body-tissue simulating liquid. Note: All SAR values normalized to 1 W forward power.

## System Validation (Body) - 1900 MHz Dipole - June 12, 2006

Dipole: 1900 MHz; Serial: 151

Ambient Temp: 23.2 °C; Fluid Temp: 23.5°C; Barometric Pressure: 101.2 kPa; Humidity: 44%

Communication System: CW

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: M1900 ( $\sigma = 1.51$  mho/m;  $\epsilon_r = 51.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>)

- Probe: EX3DV4 - SN3547; ConvF(7.84, 7.84, 7.84); Calibrated: 14/02/2006

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn370; Calibrated: 08/02/2006

- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033

- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

**1900 MHz System Validation/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

**1900 MHz System Validation/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.7 V/m; Power Drift = -0.024 dB

**SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.4 mW/g**

Maximum value of SAR (measured) = 11.9 mW/g

**1900 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.7 V/m; Power Drift = -0.033 dB

**SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.37 mW/g**

Maximum value of SAR (measured) = 11.8 mW/g

**1900 MHz System Validation/Zoom Scan 3 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.5 V/m; Power Drift = -0.011 dB

**SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.37 mW/g**

Maximum value of SAR (measured) = 11.8 mW/g

**1900 MHz System Validation/Zoom Scan 4 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.3 V/m; Power Drift = 0.003 dB

**SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.47 mW/g**

Maximum value of SAR (measured) = 12.0 mW/g

**1900 MHz System Validation/Zoom Scan 5 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.9 V/m; Power Drift = -0.004 dB

**SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.3 mW/g**

Maximum value of SAR (measured) = 11.6 mW/g

**1900 MHz System Validation/Zoom Scan 6 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.9 V/m; Power Drift = -0.007 dB

**SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.28 mW/g**

Maximum value of SAR (measured) = 11.6 mW/g

**1900 MHz System Validation/Zoom Scan 7 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.6 V/m; Power Drift = -0.008 dB

**SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.27 mW/g**

Maximum value of SAR (measured) = 11.6 mW/g

**1900 MHz System Validation/Zoom Scan 8 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.3 V/m; Power Drift = -0.006 dB

**SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.34 mW/g**

Maximum value of SAR (measured) = 11.7 mW/g

**1900 MHz System Validation/Zoom Scan 9 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.9 V/m; Power Drift = -0.019 dB

**SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.31 mW/g**

Maximum value of SAR (measured) = 11.6 mW/g

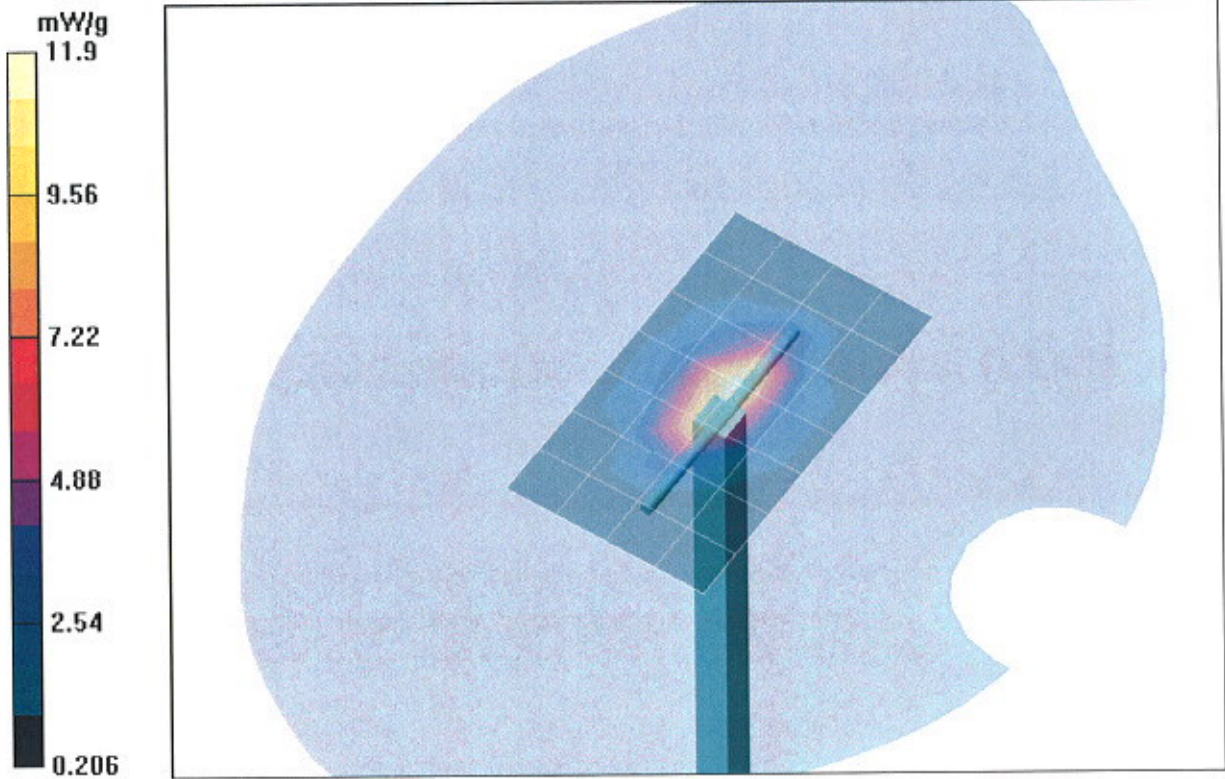
**1900 MHz System Validation/Zoom Scan 10 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.2 V/m; Power Drift = -0.013 dB

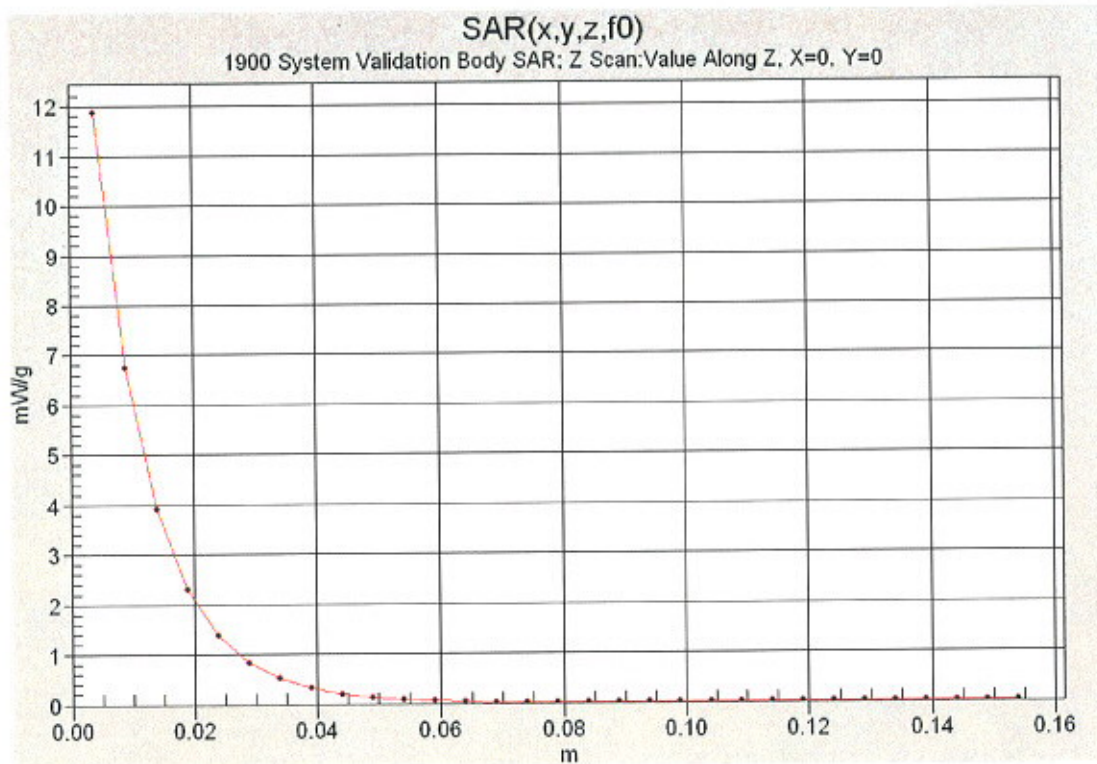
**SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.32 mW/g**

Maximum value of SAR (measured) = 11.7 mW/g





1 g average of 10 measurements: 10.35 mW/g  
 10 g average of 10 measurements: 5.34 mW/g





## 10. Measured Fluid Dielectric Parameters

### 1900 MHz Dipole System Validation (Body)

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Mon 12/Jun/2006

Frequency(GHz)

FCC\_eH FCC Bulletin 65 Supplement C ( June 2001) Limits for Head Epsilon

FCC\_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma



FCC\_eB FCC Limits for Body Epsilon

FCC\_sB FCC Limits for Body Sigma


Test\_e Epsilon of UIM

Test\_s Sigma of UIM

Freq	FCC_eB	FCC_sB	Test_e	Test_s
1.8000	53.30	1.52	51.68	1.43
1.8100	53.30	1.52	51.72	1.44
1.8200	53.30	1.52	51.59	1.44
1.8300	53.30	1.52	51.60	1.45
1.8400	53.30	1.52	51.57	1.46
1.8500	53.30	1.52	51.47	1.46
1.8600	53.30	1.52	51.50	1.48
1.8700	53.30	1.52	51.46	1.49
1.8800	53.30	1.52	51.51	1.49
1.8900	53.30	1.52	51.37	1.52
<b>1.9000</b>	<b>53.30</b>	<b>1.52</b>	<b>51.36</b>	<b>1.51</b>
1.9100	53.30	1.52	51.28	1.54
1.9200	53.30	1.52	51.23	1.54
1.9300	53.30	1.52	51.23	1.55
1.9400	53.30	1.52	51.25	1.56
1.9500	53.30	1.52	51.31	1.57
1.9600	53.30	1.52	51.16	1.59
1.9700	53.30	1.52	51.21	1.59
1.9800	53.30	1.52	51.19	1.61
1.9900	53.30	1.52	51.12	1.62
2.0000	53.30	1.52	51.13	1.63

	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15R	<u>Report Revision No.</u> Revision 1.0	 Certificate No. 2470.01
	<u>Report Issue Date</u> September 13, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

## APPENDIX F - PROBE CALIBRATION

<b>Company:</b>	Plantronics Inc.	<b>FCC ID:</b>	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
<b>Model(s):</b>	CA12CD (Remote)	<b>Device:</b>	Wireless Headset Adaptor (Remote Unit with PTT)		
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Accredited by the Swiss Federal Office of Metrology and Accreditation  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Celltech Labs**

Certificate No: **ET3-1387\_Mar06**

## CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1387**

Calibration procedure(s) **QA/CAL-01.v5  
Calibration procedure for dosimetric E-field probes**

Calibration date: **March 16, 2006**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^\circ\text{C}$  and humidity  $< 70\%$ .

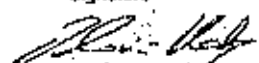

Calibration Equipment used (M&PE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
DAE4	SN: 654	2-Feb-06 (SPEAG, No. DAE4-654_Feb06)	Feb-07

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 804BC	US3642U01700	4-Aug-09 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov-06

Calibrated by: **Name: Katja Pokovic, Function: Technical Manager**

Approved by: **Name: Niels Kuster, Function: Quality Manager**

Signature  
  


Issued: March 16, 2006

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.





Accredited by the Swiss Federal Office of Metrology and Accreditation  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

### Glossary:

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

### Calibration Is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not effect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe ET3DV6

## SN:1387

Manufactured:	September 21, 1999
Last calibrated:	March 18, 2005
Recalibrated:	March 16, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

**DASY - Parameters of Probe: ET3DV6 SN:1387****Sensitivity in Free Space<sup>A</sup>****Diode Compression<sup>B</sup>**

NormX	1.62 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	92 mV
NormY	1.72 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	92 mV
NormZ	1.72 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	92 mV

**Sensitivity in Tissue Simulating Liquid (Conversion Factors)**

Please see Page 8.

**Boundary Effect**

TSL                      900 MHz      Typical SAR gradient: 5 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR <sub>ba</sub> [%]	Without Correction Algorithm	9.3	5.0
SAR <sub>ba</sub> [%]	With Correction Algorithm	0.1	0.2

**Sensor Offset**

Probe Tip to Sensor Center                      2.7 mm

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.

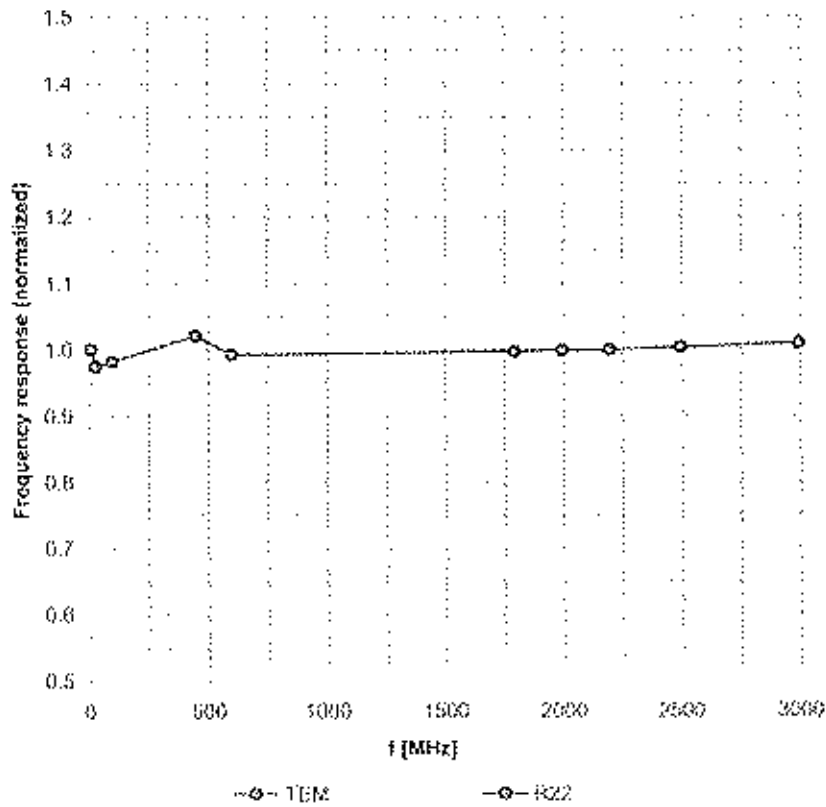
<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Page 8).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.



# Frequency Response of E-Field

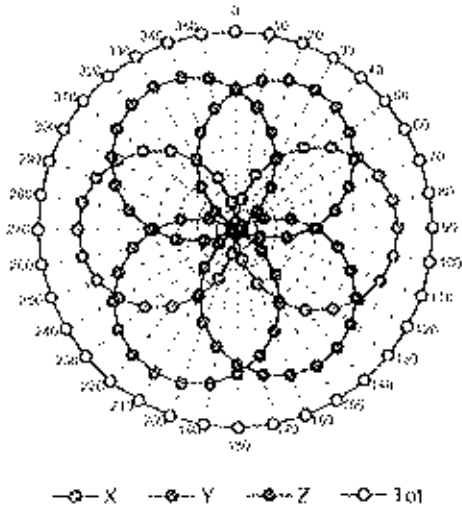
(TEM-Cell; ifj110 EXX, Waveguide: R22)



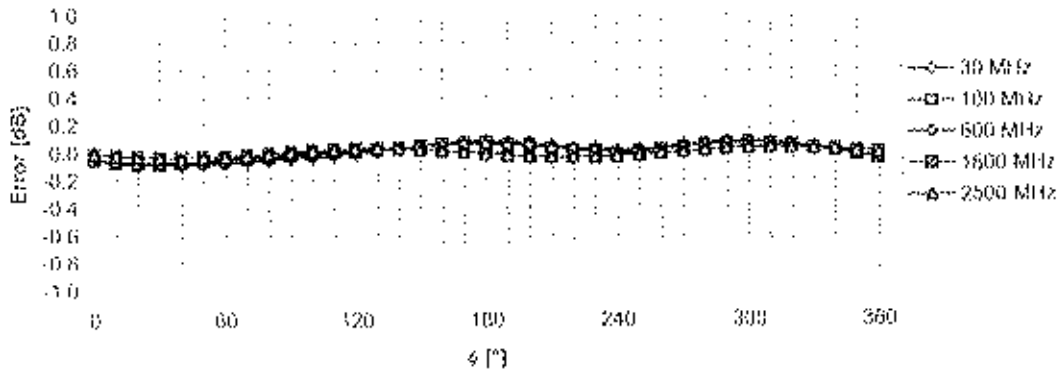
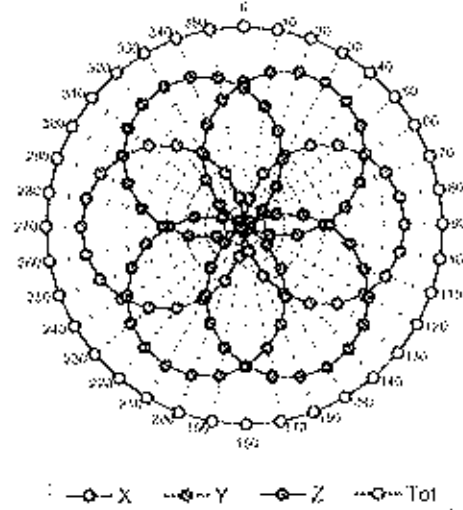
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$

f = 600 MHz, TEM 1R110EXX

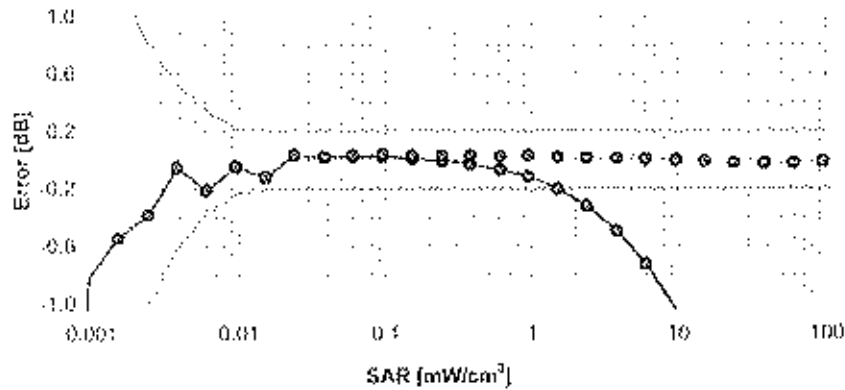
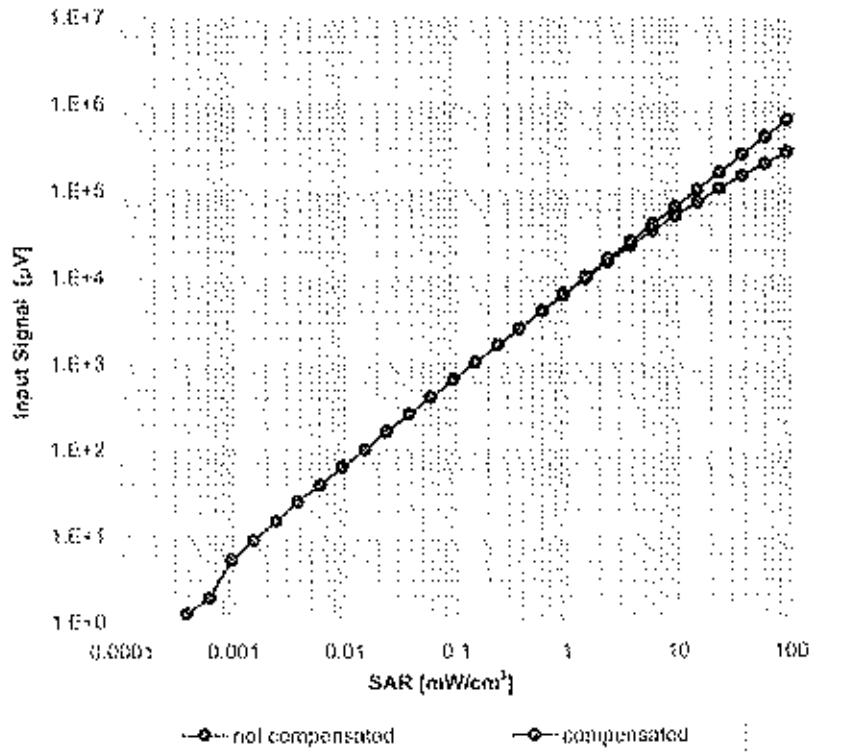


f = 1800 MHz, WG R22



Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

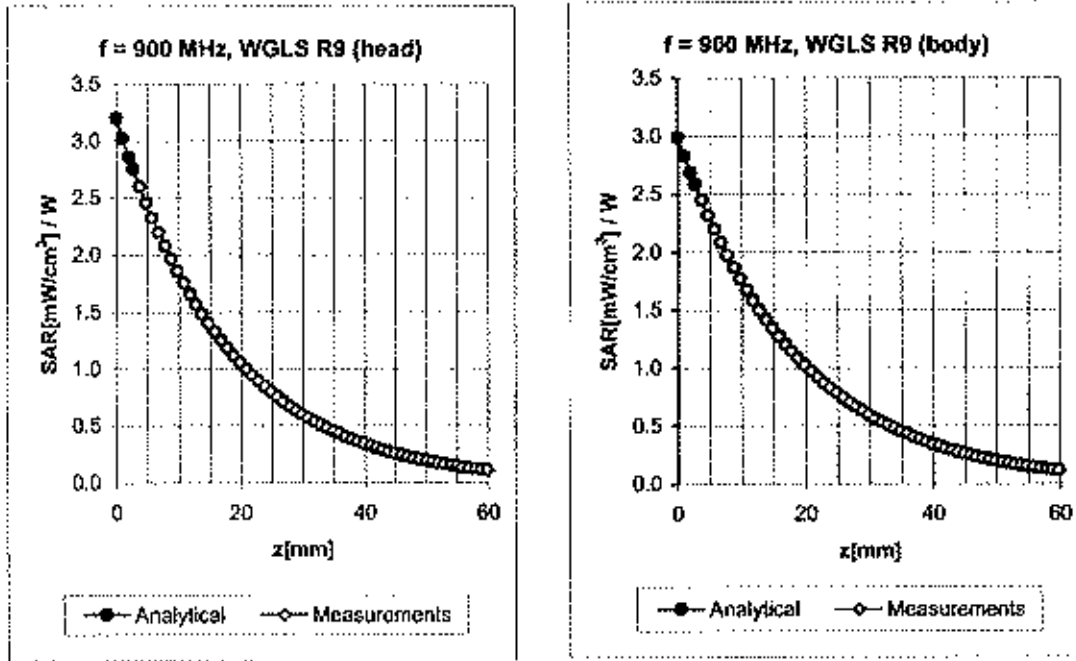
### Dynamic Range $f(SAR_{head})$ (Waveguide R22, $f = 1800$ MHz)



Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )



## Conversion Factor Assessment

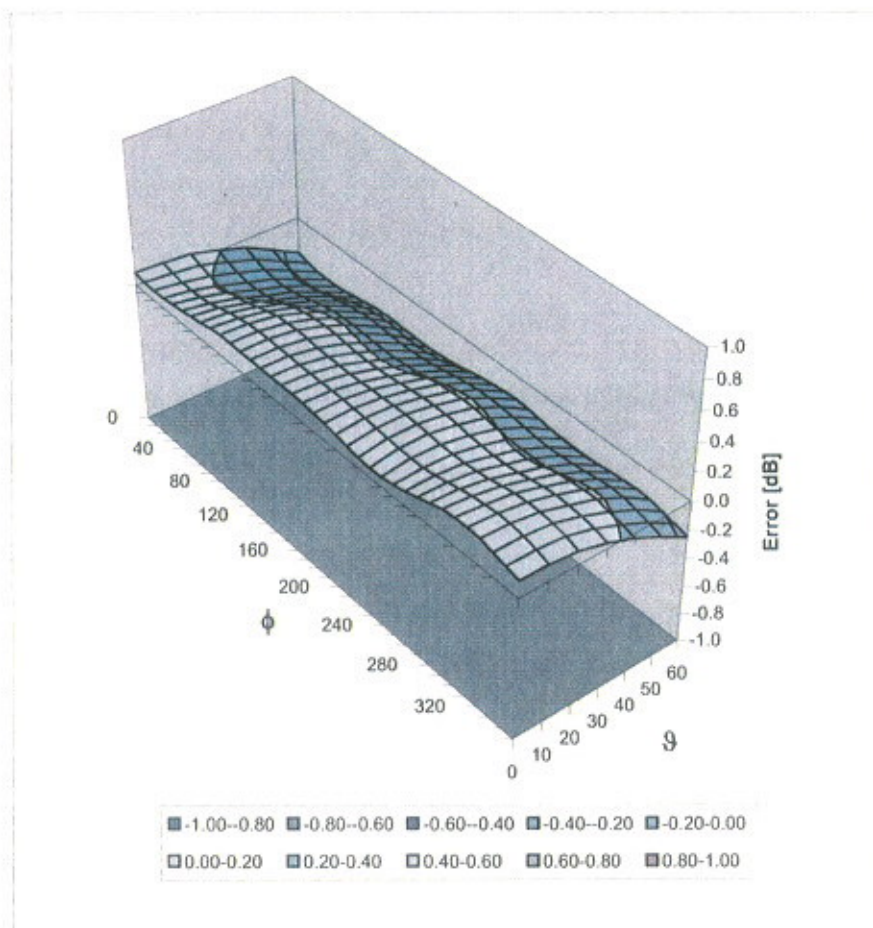


f [MHz]	Validity [MHz] <sup>c</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.62	1.86	6.35 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.59	1.97	6.04 ± 11.0% (k=2)

<sup>c</sup> The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

## Deviation from Isotropy in HSL

Error ( $\phi$ ,  $\theta$ ),  $f = 900$  MHz



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )

## **Additional Conversion Factors**

**for Dosimetric E-Field Probe**

Type:

**ET3DV6**

Serial Number:

**1387**

Place of Assessment:

**Zurich**

Date of Assessment:

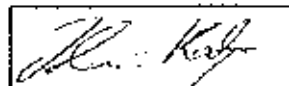
**March 18, 2006**

Probe Calibration Date:

**March 16, 2006**

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:1387**Conversion factor ( $\pm$  standard deviation)


150 $\pm$ 50 MHz	ConvF	8.6 $\pm$ 10%	$\epsilon_r = 52.3 \pm 5\%$ $\sigma = 0.76 \pm 5\%$ mho/m (head tissue)
150 $\pm$ 50 MHz	ConvF	8.2 $\pm$ 10%	$\epsilon_r = 61.9 \pm 5\%$ $\sigma = 0.80 \pm 5\%$ mho/m (body tissue)
300 $\pm$ 50 MHz	ConvF	7.8 $\pm$ 9%	$\epsilon_r = 45.3 \pm 5\%$ $\sigma = 0.87 \pm 5\%$ mho/m (head tissue)
450 $\pm$ 50 MHz	ConvF	7.4 $\pm$ 8%	$\epsilon_r = 43.5 \pm 5\%$ $\sigma = 0.87 \pm 5\%$ mho/m (head tissue)
450 $\pm$ 50 MHz	ConvF	7.3 $\pm$ 8%	$\epsilon_r = 56.7 \pm 5\%$ $\sigma = 0.94 \pm 5\%$ mho/m (body tissue)
750 $\pm$ 50 MHz	ConvF	6.6 $\pm$ 7%	$\epsilon_r = 41.8 \pm 5\%$ $\sigma = 0.89 \pm 5\%$ mho/m (head tissue)
750 $\pm$ 50 MHz	ConvF	6.4 $\pm$ 7%	$\epsilon_r = 55.4 \pm 5\%$ $\sigma = 0.96 \pm 5\%$ mho/m (body tissue)
1925 $\pm$ 50 MHz	ConvF	5.0 $\pm$ 7%	$\epsilon_r = 39.8 \pm 5\%$ $\sigma = 1.48 \pm 5\%$ mho/m (head tissue)
1925 $\pm$ 50 MHz	ConvF	4.7 $\pm$ 7%	$\epsilon_r = 53.2 \pm 5\%$ $\sigma = 1.60 \pm 5\%$ mho/m (body tissue)

**Important Note:**

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.  
Please see also Section 4.7 of the DASY4 Manual.

	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15R	<u>Report Revision No.</u> Revision 1.0	 Certificate No. 2470.01
	<u>Report Issue Date</u> September 13, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**APPENDIX G - SAM PHANTOM CERTIFICATE OF CONFORMITY**

<b>Company:</b>	Plantronics Inc.	<b>FCC ID:</b>	AL8CA12CDYYYY	1921.536 - 1928.448 MHz	
<b>Model(s):</b>	CA12CD (Remote)	<b>Device:</b>	Wireless Headset Adaptor (Remote Unit with PTT)		
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# Schmid & Partner Engineering AG

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

## Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 BA
Series No	TP-1002 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

### Tests

The series production process used allows the limitation to test of first articles.  
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz - 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

### Standards

- [1] CENELEC EN 50381
  - [2] IEEE P1528-200x draft 6.5
  - [3] IEC PT 62209 draft 0.9
- (\*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

### Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date 18.11.2001

Signature / Stamp  Schmid & Partner Engineering AG 

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Tel. +41 1 245 97 00, Fax +41 1 245 97 79