
	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15B	<u>Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

RF EXPOSURE EVALUATION
SPECIFIC ABSORPTION RATE

SAR TEST REPORT

FOR

PLANTRONICS INC.

WIRELESS HEADSET ADAPTOR (Base Unit)

MODEL: CA12CD (Base)

FCC ID: AL8CA12CDXXXX

TEST STANDARD(S) & PROCEDURE(S) APPLIED
FCC OET Bulletin 65, Supplement C (01-01)
Industry Canada RSS-102 Issue 2
IEEE 1528-2003

Test Report Serial No.

090106AL8-T771-S15B

Test Report Revision No.

Revision 1.0 (Initial Release)

Revision 1.1 (Device photos removed for short-term confidentiality)

Test Location

Celltech Compliance Testing & Engineering Lab
(Celltech Labs Inc.)
1955 Moss Court
Kelowna, BC
Canada
V1Y 9L3




Certificate No. 2470.01



Test Report Prepared By:

Cheri Frangiadakis
Test Report Writer
Celltech Labs Inc.

Test Report Reviewed By:

Jonathan Hughes
General Manager
Celltech Labs Inc.

Company: Plantronics Inc.	FCC ID: AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s): CA12CD (Base)	Device: Wireless Headset Adaptor (Base Unit)		
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DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION

<u>Test Lab and Location</u> CELLTECH LABS INCORPORATED Testing and Engineering Services 1955 Moss Court Kelowna, B.C. Canada V1Y 9L3 Phone: 250-448-7047 Fax: 250-448-7046 e-mail: info@celltechlabs.com web site: www.celltechlabs.com		<u>Company Information</u> PLANTRONICS INC. 345 Encinal Street Santa Cruz, CA 95060 United States	
FCC ID:	AL8CA12CDXXXX		
Model(s):	CA12CD (Base)		
Test Standard(s):	FCC 47 CFR §2.1093; Health Canada Safety Code 6		
Test Procedure(s):	FCC OET Bulletin 65, Supplement C (01-01)		
	Industry Canada RSS-102 Issue 2		
	IEEE 1528-2003		
FCC Device Classification:	Part 15 Unlicensed PCS Base Station (PUB)		
IC Device Classification:	2 GHz Licence-exempt Personal Communications Service Device (LE-PCS)		
Device Description:	Wireless Headset Adaptor (Base Unit)		
Mode of Operation:	TDMA/TDD		
Transmit Frequency Range:	1921.536 - 1928.448 MHz		
RF Output Power Tested:	2.7 dBm (1.86 mW) Conducted - Antenna 0 (Right Side of DUT)		
	0.9 dBm (1.23 mW) Conducted - Antenna 1 (Left Side of DUT)		
Max. Duty Cycle Tested:	8.3 % Source-Based Time-Averaged (Crest Factor: 1:12.05)		
Antenna Type(s) Tested:	Internal Diversity (Antenna 0 / Antenna 1)		
Power Source(s) Tested:	7.5 W Plantronics AC Adapter (P/N: 45561-02)		
Max. SAR Level(s) Evaluated:	Body: 0.006 W/kg (Peak SAR measured from Area Scan)		

Celltech Labs Inc. declares under its sole responsibility that this wireless device is compliant with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 2 and IEEE Standard 1528-2003 for the General Population / Uncontrolled Exposure environment. All measurements were performed in accordance with the SAR system manufacturer recommendations.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc. The results and statements contained in this report pertain only to the device(s) evaluated.

Test Report Approved By:
Sean Johnston
SAR Lab Manager
Celltech Labs Inc.




Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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1.0 INTRODUCTION

This measurement report demonstrates that the PLANTRONICS Model: CA12CD Wireless Headset Adaptor (Base Unit) complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the General Population / Uncontrolled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3]), IC RSS-102 Issue 2 (see reference [4]), and IEEE Standard 1528-2003 (see reference [5]) were employed. A description of the product, operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

2.0 DESCRIPTION OF DEVICE UNDER TEST (DUT)

Test Standard(s)	FCC	47 CFR §2.1093		
	IC	Health Canada Safety Code 6		
Device Classification(s)	Part 15 Unlicensed PCS Base Station (PUB)			FCC §15(D)
	2 GHz Licence-exempt Personal Communications Service Device (LE-PCS)			IC RSS-213
Measurement Procedure(s)	FCC OET Bulletin 65, Supplement C (01-01)			
	Industry Canada RSS-102 Issue 2			
	IEEE Standard 1528-2003			
Device Description	Wireless Headset Adaptor (Base Unit)			
RF Exposure Category	General Population / Uncontrolled Environment			
FCC ID	AL8CA12CDXXXX			
Model(s)	CA12CD (Base)			
Serial No.(s) Tested	219		Production Unit	
Transmit Frequency Range	1921.536 - 1928.448 MHz		UPCS Band	
Mode(s) of Operation	TDMA (Time Division Multiple Access)		TDD (Time Division Duplex)	
Maximum Duty Cycle Tested	8.3 %	Source-Based Time-Averaged		Crest Factor: 1:12.05
Max. RF Output Power Tested	2.7 dBm	1.86 mW	Conducted	Antenna 0
	0.9 dBm	1.23 mW	Conducted	Antenna 1
Antenna Type(s) Tested	Internal Diversity	Antenna 0 - Right Side of DUT		Antenna1 - Left Side of DUT
Power Source(s) Tested	Plantronics	7.5 W AC Adapter		Part No.: 45561-02

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3.0 SAR MEASUREMENT SYSTEM


Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain and/or body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the DASY4 measurement server. The DAE4 utilizes a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the DASY4 measurement server is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.



DASY4 Measurement System with SAM Phantom and device holder



DASY4 Measurement System with SAM Phantom and validation dipole


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4.0 MEASUREMENT SUMMARY

BODY SAR EVALUATION RESULTS

Freq. (MHz)	Chan.	Test Mode	Power Source	Antenna Tested	Device Position to Planar Phantom	Separation Distance to Planar Phantom	Conducted Power Before Test	Peak SAR Measured from Area Scan	
1924.992	Mid	TDMA/TDD	AC Adapter	Antenna 1	Left Side	0.0 cm (Touch)	0.9 dBm	0.003 W/kg	
1924.992	Mid	TDMA/TDD	AC Adapter	Antenna 0	Right Side	0.0 cm (Touch)	2.7 dBm	0.004 W/kg	
1924.992	Mid	TDMA/TDD	AC Adapter	Antenna 0	Front Side	0.0 cm (Touch)	2.7 dBm	0.006 W/kg	
ANSI / IEEE C95.1 1999 - SAFETY LIMIT			BODY: 1.6 W/kg (averaged over 1 gram)			Spatial Peak Uncontrolled Exposure / General Population			
Test Date(s)	September 06, 2006				Relative Humidity	33	%		
Measured Fluid Type	1920 MHz Body				Atmospheric Pressure	101.2	kPa		
Dielectric Constant ϵ_r	IEEE Target		Measured	Deviation	Ambient Temperature	24.2	°C		
	53.3	± 5%	51.6	-3.2%	Fluid Temperature	23.8	°C		
Conductivity σ (mho/m)	IEEE Target		Measured	Deviation	Fluid Depth	≥ 15			
	1.52	± 5%	1.50	-1.3%	ρ (Kg/m ³)	1000			
Note(s)	1.	The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.							
	2.	The transmission band of the DUT is less than 10 MHz; therefore mid channel data only is reported (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [3]).							
	3.	The SAR levels measured were the Peak SAR level measured from the area scan. The 1g-averaged SAR was not measured because the peak SAR values from the area scan evaluations were less than 1% of the 1g average limit. The peak SAR value measured during the area scan evaluation is reported. The mathematical formula used to extrapolate the SAR value at the surface from the zoom scan SAR values measured at 5 mm steps leading away from the surface assumes a curving slope (i.e. the SAR values gradually decrease as the probe moves away from the surface). When the peak SAR of a device is so low that the RF noise level is competing with the SAR level, the zoom scan measurements leading away from the surface are no longer a curving slope and the extrapolation formula cannot accurately estimate the 1g average SAR. In this manner we have reported the peak values from the area scan in place of the 1g averaged SAR values whenever the peak values are less than 1% of the average limit. This avoids gross uncertainties in the 1g average SAR calculation while maintaining a conservative estimation of the SAR level.							
	4.	The power drifts were measured by the DASY4 system during the SAR evaluations at the reference point of the phantom with low SAR. The drift levels were inaccurate due to the SAR value at the reference point is close to the measurement noise floor and therefore are not reported.							
	5.	The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluations. The temperatures reported were consistent for all measurement periods.							
	6.	The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C for measured fluid dielectric parameters).							
	7.	The SAR measurements were performed within 24 hours of the system performance check.							

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5.0 DETAILS OF SAR EVALUATION

The PLANTRONICS Model: CA12CD Wireless Headset Adaptor (Base Unit) was compliant for localized Specific Absorption Rate (SAR) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix D.

- 1) The DUT was tested for body SAR with the left side (Antenna 1) facing parallel to, and touching, the outer surface of the SAM phantom (planar section).
- 2) The DUT was tested for body SAR with the right side (Antenna 0) facing parallel to, and touching, the outer surface of the SAM phantom (planar section).
- 3) The DUT was tested for body SAR with the front side (Antenna 0) facing parallel to, and touching, the outer surface of the SAM phantom (planar section).
- 4) The DUT was evaluated for SAR with the Plantronics 7.5 W AC power adapter.
- 5) The DUT was evaluated for SAR at maximum power in TDMA/TDD mode with a source-based time-averaged duty cycle of 8.3% (crest factor = 1:12.05).
- 6) The conducted power level(s) of the DUT were measured prior to the SAR evaluations by Plantronics using a Rohde & Schwarz CMD60 digital radiocommunication tester (Unit No. 5212J, calibrated February 24, 2006).
- 7) A stack of low-density, low-loss dielectric foamed polystyrene was used in place of the device holder.
- 8) The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluations. The temperatures reported were consistent for all measurement periods.
- 9) The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C for measured dielectric parameters).
- 10) The SAR measurements were performed within 24 hours of the system performance check.

6.0 EVALUATION PROCEDURES

- a. (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.
(ii) For body-worn and face-held devices a planar phantom was used.
- b. The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.
An area scan was determined as follows:
- c. Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.
- d. A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.
A 1g and 10g spatial peak SAR was determined as follows:
- e. Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix F). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.
- f. Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).
- g. A zoom scan volume of 32 mm x 32 mm x 30 mm (5x5x7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency < 800 MHz. Zoom scans for frequencies ≥ 800 MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7x7x7 points) to ensure complete capture of the peak spatial-average SAR.

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7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations a system check was performed at the planar section of the SAM phantom with a 1900MHz dipole (see Appendix E for system validation procedures). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C for measured fluid dielectric parameters). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of $\pm 10\%$ (see Appendix B for system performance check test plot). See Table 1 below for the SAR system manufacturer's reference body SAR values from the DASY4 Operation Manual (see reference [6]).

SYSTEM PERFORMANCE CHECK EVALUATION

Test Date	Equiv. Tissue	SAR 1g (W/kg)			Dielectric Constant ϵ_r			Conductivity σ (mho/m)			ρ (Kg/m ³)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.						
9/6/06	Body	9.95 $\pm 10\%$	10.9	+9.5%	53.3 $\pm 5\%$	51.5	-3.4%	1.52 $\pm 5\%$	1.49	-2.0%	1000	24.2	23.8	≥ 15	33	101.2
Note(s)		1. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the system performance check. The temperatures listed in the table above were consistent for all measurement periods.														

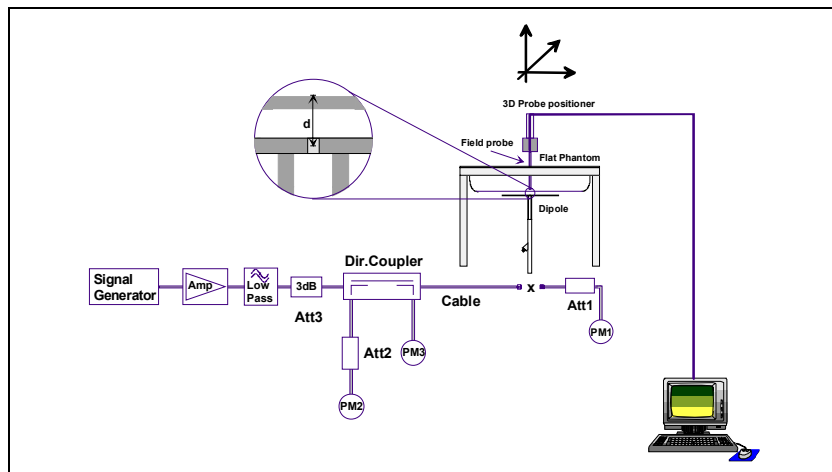


Figure 1. System Performance Check Measurement Setup



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.

Table 1. SAR System Manufacturer's Reference Body SAR Values



1900MHz Dipole Setup

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8.0 SIMULATED EQUIVALENT TISSUES



The 1900/1920MHz simulated equivalent tissue mixture consisted of Glycol-monobutyl, water, and salt. The fluid was prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).

1900/1920 MHz SIMULATED TISSUE MIXTURES		
INGREDIENT	1900 MHz Body	1920 MHz Body
	System Performance Check	DUT Evaluation
Water	69.85 %	69.85 %
Glycol Monobutyl	29.89 %	29.89 %
Salt	0.26 %	0.26 %

9.0 SAR SAFETY LIMITS


EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0
Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.		
Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.		



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10.0 ROBOT SYSTEM SPECIFICATIONS

<u>Specifications</u>	
Positioner	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability	0.02 mm
No. of axis	6
<u>Data Acquisition Electronic (DAE) System</u>	
<u>Cell Controller</u>	
Processor	AMD Athlon XP 2400+
Clock Speed	2.0 GHz
Operating System	Windows XP Professional
<u>Data Converter</u>	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	Measurement Software: DASY4, V4.7 Build 44
	Postprocessing Software: SEMCAD, V1.8 Build 171
Connecting Lines	Optical downlink for data and status info.; Optical uplink for commands and clock
<u>DASY4 Measurement Server</u>	
Function	Real-time data evaluation for field measurements and surface detection
Hardware	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections	COM1, COM2, DAE, Robot, Ethernet, Service Interface
<u>E-Field Probe</u>	
Model	ET3DV6
Serial No.	1387
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
<u>Phantom(s)</u>	
Type	SAM V4.0C
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 25 liters

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11.0 PROBE SPECIFICATION (ET3DV6)

Construction: Symmetrical design with triangular core
 Built-in shielding against static charges
 PEEK enclosure material (resistant to organic solvents, glycol)

Calibration: In air from 10 MHz to 2.5 GHz
 In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$)

Frequency: 10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)

Directivity: ± 0.2 dB in brain tissue (rotation around probe axis)
 ± 0.4 dB in brain tissue (rotation normal to probe axis)

Dynamic Range: 5 μ W/g to > 100 mW/g; Linearity: ± 0.2 dB

Surface Detect: ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces

Dimensions: Overall length: 330 mm
 Tip length: 16 mm
 Body diameter: 12 mm
 Tip diameter: 6.8 mm
 Distance from probe tip to dipole centers: 2.7 mm

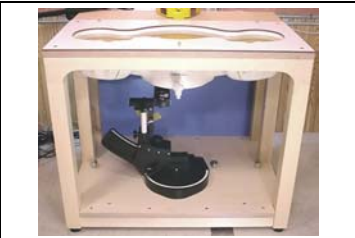
Application: General dosimetry up to 3 GHz
 Compliance tests of mobile phone



ET3DV6 E-Field Probe

12.0 SAM PHANTOM V4.0C

The SAM phantom V4.0C is a fiberglass shell phantom with a 2.0 mm (+/-0.2 mm) shell thickness for left and right head and flat planar area integrated in a wooden table. The shape of the fiberglass shell corresponds to the phantom defined by SCC34-SC2. The device holder positions are adjusted to the standard measurement positions in the three sections (see Appendix G for specifications of the SAM phantom V4.0C).




SAM Phantom V4.0C

13.0 DEVICE HOLDER

The DASY4 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.



Device Holder

Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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14.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED		CALIBRATION DUE DATE
USED	DESCRIPTION			Brain	Body	
x	Schmid & Partner DASY4 System	-	-	-	-	-
x	-DASY4 Measurement Server	00158	1078	N/A	N/A	N/A
x	-Robot	00046	599396-01	N/A	N/A	N/A
x	-DAE4	00019	353	21Jun06		21Jun07
	-DAE3	00018	370	08Feb06		08Feb07
x	-ET3DV6 E-Field Probe	00016	1387	16Mar06		16Mar07
	-EX3DV4 E-Field Probe	00125	3547	14Feb06		14Feb07
	-300MHz Validation Dipole	00023	135	25Oct05		25Oct06
	-450MHz Validation Dipole	00024	136	25Oct05		25Oct06
	-835MHz Validation Dipole	00022	411	Brain	28Mar06	28Mar07
				Body	27Mar06	27Mar07
	-900MHz Validation Dipole	00020	054	Brain	06Jun06	06Jun07
				Body	06Jun06	06Jun07
	-1640MHz Validation Dipole	00212	0175	Brain	07Aug06	07Aug07
	-1800MHz Validation Dipole	00021	247	Brain	08Jun06	08Jun07
				Body	09Jun06	09Jun07
	-1900MHz Validation Dipole	00032	151	Brain	09Jun06	09Jun07
x				Body	12Jun06	12Jun07
	-2450MHz Validation Dipole	00025	150	Brain	20Sep05	20Sep06
				Body	24Apr06	24Apr07
	-5800MHz Validation Dipole	00126	1031	Brain	15Mar06	15Mar07
x	-SAM Phantom V4.0C	00154	1033	N/A		N/A
	-Barski Planar Phantom	00155	03-01	N/A		N/A
	-Plexiglas Side Planar Phantom	00156	161	N/A		N/A
	-Plexiglas Validation Planar Phantom	00157	137	N/A		N/A
x	ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A		N/A
	Gigatronics 8652A Power Meter	00110	1835801	12Apr06		12Apr07
x	Gigatronics 8652A Power Meter	00007	1835272	03Feb06		03Feb07
	Gigatronics 80701A Power Sensor	00011	1833542	03Feb06		03Feb07
x	Gigatronics 80701A Power Sensor	00012	1834350	12Sep05		12Sep06
x	Gigatronics 80701A Power Sensor	00013	1833713	03Feb06		03Feb07
x	HP 8753ET Network Analyzer	00134	US39170292	18Apr06		18Apr07
x	HP 8648D Signal Generator	00005	3847A00611	N/A		N/A
	Rohde & Schwarz SMR40 Signal Generator	00006	100104	06Apr06		06Apr07
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	N/A		N/A

15.0 MEASUREMENT UNCERTAINTIES



UNCERTAINTY BUDGET FOR DEVICE EVALUATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V _i or V _{eff}
Measurement System						
Probe calibration (1920 MHz)	3.5	Normal	1	1	3.5	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	0.7	1.9	∞
Spherical isotropy of the probe	9.6	Rectangular	1.732050808	0.7	3.9	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	1	Rectangular	1.732050808	1	0.6	∞
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	∞
Detection limit	1	Rectangular	1.732050808	1	0.6	∞
Readout electronics	0.3	Normal	1	1	0.3	∞
Response time	0.8	Rectangular	1.732050808	1	0.5	∞
Integration time	2.6	Rectangular	1.732050808	1	1.5	∞
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	∞
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	∞
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	∞
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	∞
Test Sample Related						
Device positioning	2.9	Normal	1	1	2.9	12
Device holder uncertainty	3.6	Normal	1	1	3.6	8
Power drift	5	Rectangular	1.732050808	1	2.9	∞
Phantom and Setup						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	∞
Combined Standard Uncertainty					9.69	
Expanded Uncertainty (k=2)					19.39	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

MEASUREMENT UNCERTAINTIES (CONT.)


UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V _i or V _{eff}
Measurement System						
Probe calibration	3.5	Normal	1	1	3.5	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	1	2.7	∞
Spherical isotropy of the probe	0	Rectangular	1.732050808	1	0.0	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	1	Rectangular	1.732050808	1	0.6	∞
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	∞
Detection limit	1	Rectangular	1.732050808	1	0.6	∞
Readout electronics	0.3	Normal	1	1	0.3	∞
Response time	0	Rectangular	1.732050808	1	0.0	∞
Integration time	0	Rectangular	1.732050808	1	0.0	∞
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	∞
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	∞
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	∞
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	∞
Dipole						
Dipole Positioning	2	Normal	1.732050808	1	1.2	∞
Power & Power Drift	4.7	Normal	1.732050808	1	2.7	∞
Phantom and Setup						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	∞
Combined Standard Uncertainty					7.69	
Expanded Uncertainty (k=2)					15.39	



Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15B	<u>Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	


16.0 REFERENCES


- [1] Federal Communications Commission - "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093: 1999.
- [2] Health Canada - "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz", Safety Code 6:1999.
- [3] Federal Communications Commission - "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.
- [4] Industry Canada - "Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 2: November 2005.
- [5] IEEE Standard 1528-2003 - "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques": December 2003.
- [6] Schmid & Partner Engineering AG - "DASY4 Manual", V4.5: March 2005.

Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX A - SAR MEASUREMENT DATA

Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 09/06/2006

Body SAR - Left Side of DUT - Antenna 1 - 1924.992 MHz - Mid Channel - Touch Position

DUT: Plantronics Inc. Model: CA12CD; Type: Wireless Headset Adaptor (Base Unit); Serial: 219

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

Power Source: 7.5 W AC Adapter

Communication System: TDMA/TDD

RF Output Power: 0.9 dBm (Conducted)

Frequency: 1924.992 MHz; Duty Cycle: 1:12.05

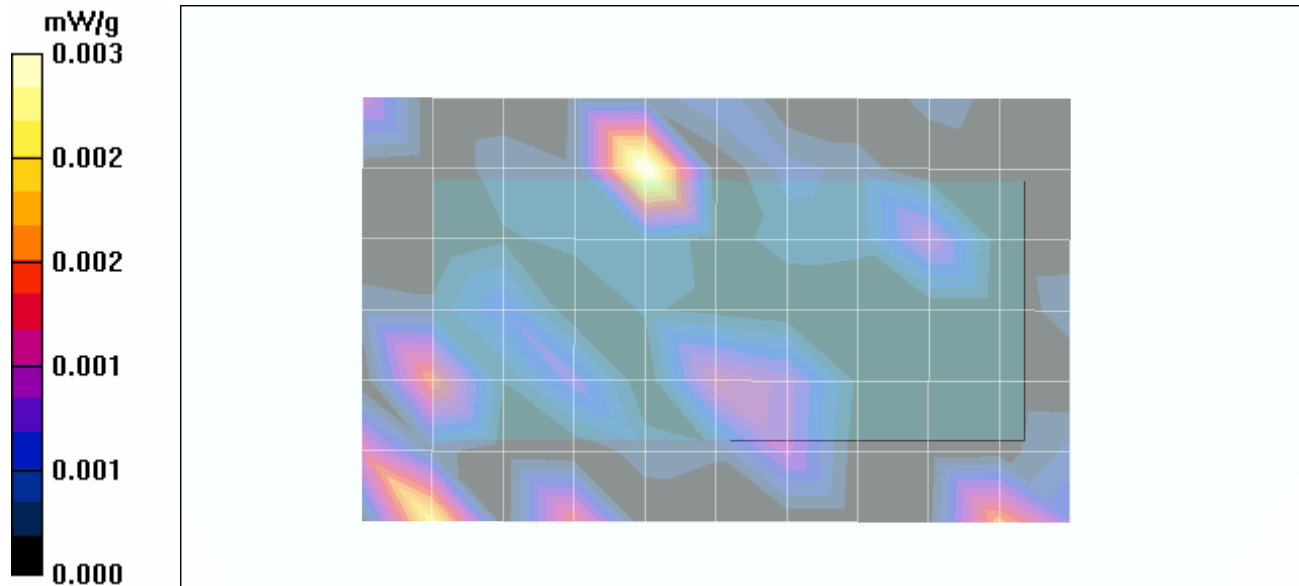
Medium: M1920 ($\sigma = 1.50 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$)


- 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: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171



Body SAR - Left Side of DUT Touching Planar Phantom - Mid Channel

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

Maximum Peak Value of SAR (measured) = 0.003 mW/g



Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15B	<u>Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 09/06/2006

Body SAR - Right Side of DUT - Antenna 0 - 1924.992 MHz - Mid Channel - Touch Position

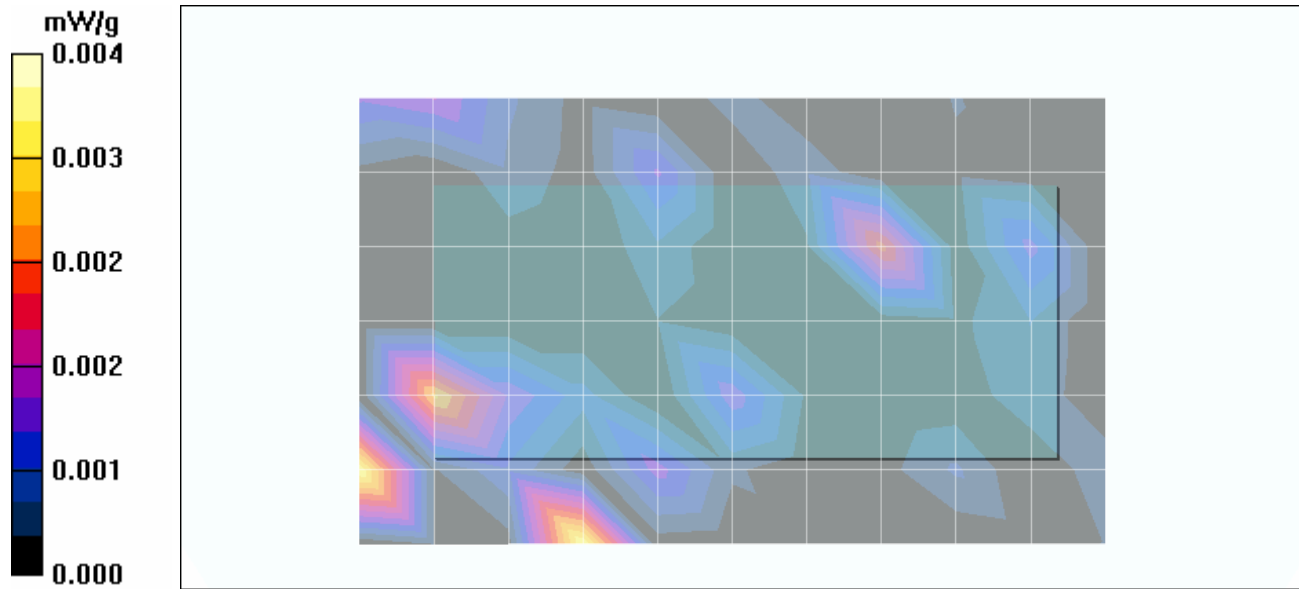
DUT: Plantronics Inc. Model: CA12CD; Type: Wireless Headset Adaptor (Base Unit); Serial: 219


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



Power Source: 7.5 W AC Adapter
Communication System: TDMA/TDD
RF Output Power: 2.7 dBm (Conducted)
Frequency: 1924.992 MHz; Duty Cycle: 1:12.05
Medium: M1920 ($\sigma = 1.50$ mho/m; $\epsilon_r = 51.6$; $\rho = 1000$ kg/m³)

- 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 SAR - Right Side of DUT Touching Planar Phantom - 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:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15B	<u>Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 09/06/2006

Body SAR - Front Side of DUT - Antenna 0 - 1924.992 MHz - Mid Channel - Touch Position

DUT: Plantronics Inc. Model: CA12CD; Type: Wireless Headset Adaptor (Base Unit); Serial: 219

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

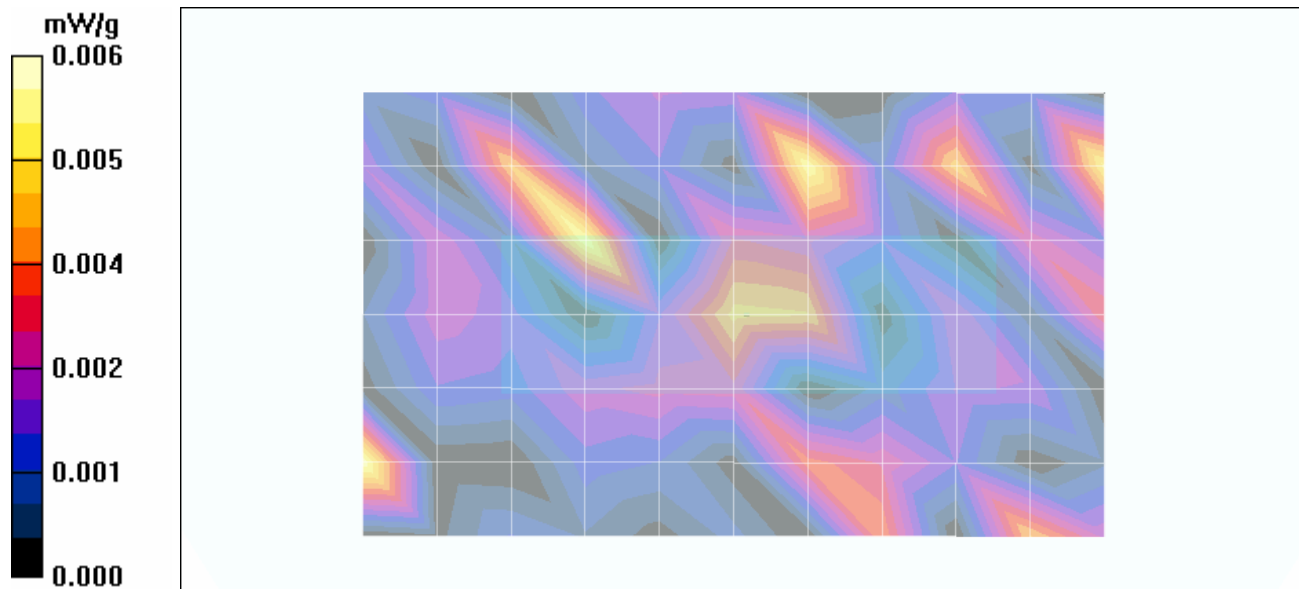
Power Source: 7.5 W AC Adapter
Communication System: TDMA/TDD
RF Output Power: 2.7 dBm (Conducted)
Frequency: 1924.992 MHz; Duty Cycle: 1:12.05
Medium: M1920 ($\sigma = 1.50$ mho/m; $\epsilon_r = 51.6$; $\rho = 1000$ kg/m³)


- 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: Fibreglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171



Body SAR - Front Side of DUT Touching Planar Phantom - Mid Channel

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

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






Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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Fluid Depth (>15cm)




Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> 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: M1900 ($\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$)

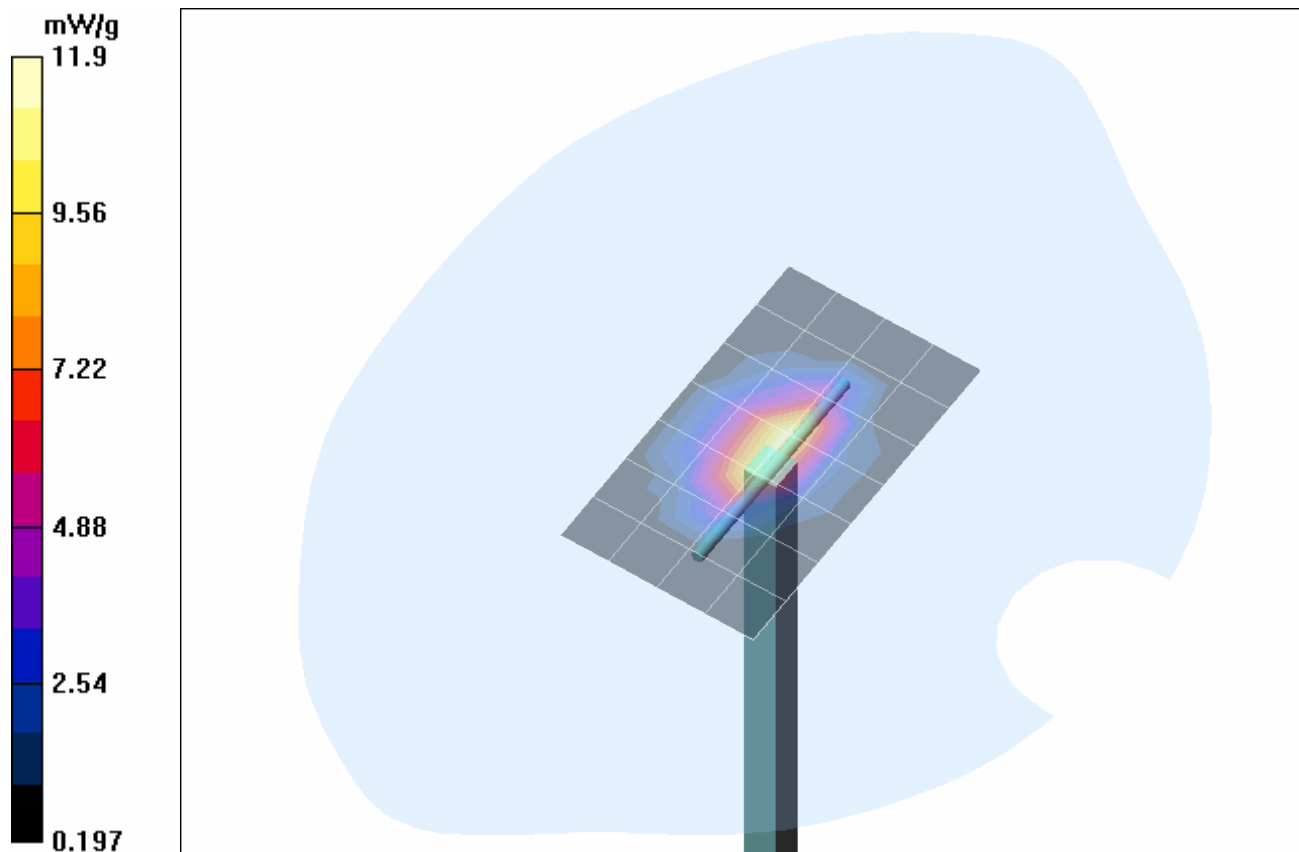
- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD,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


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

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

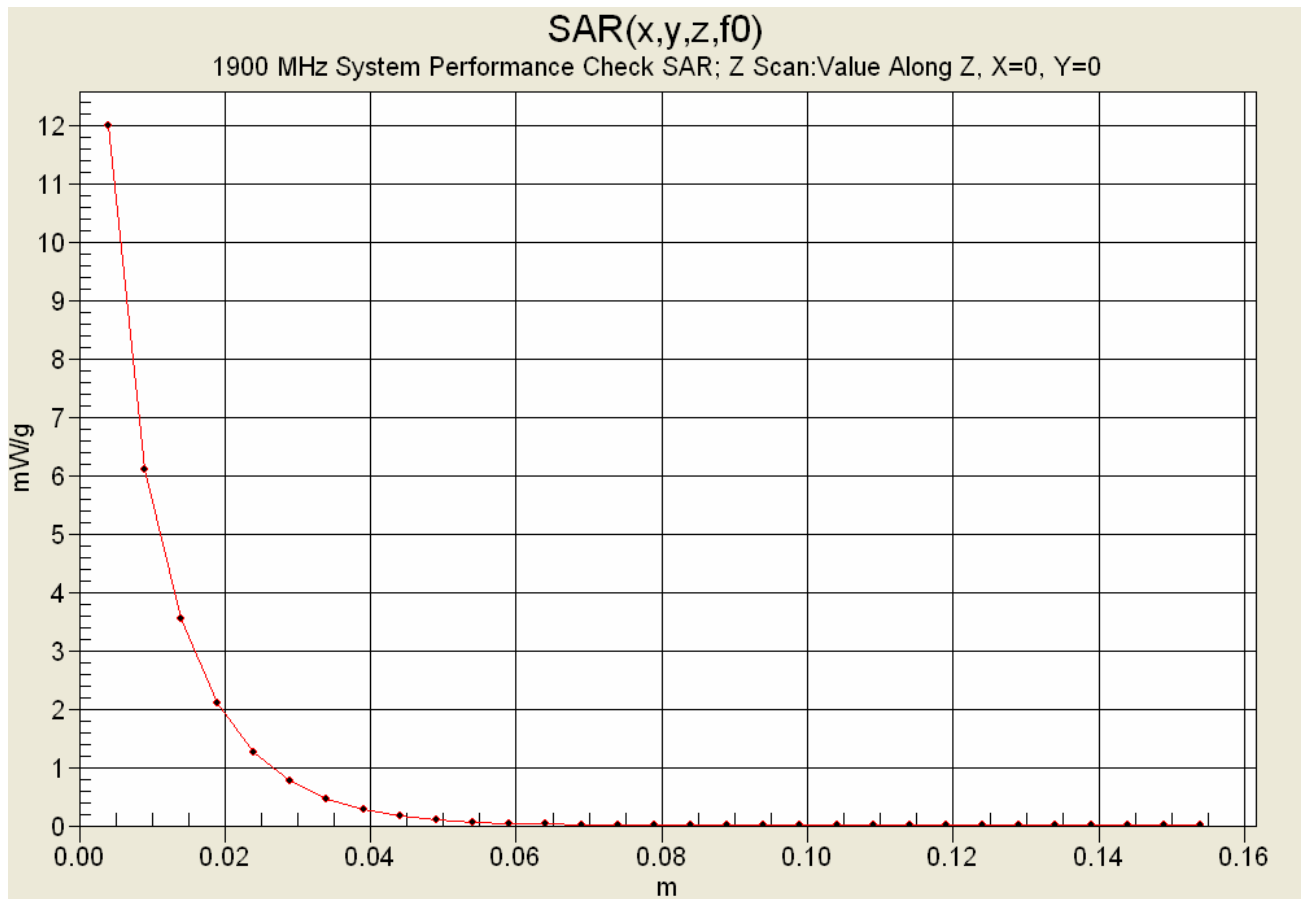
1900 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:



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:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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Z-Axis Scan



	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15B	<u>Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS


Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> 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_eHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
 FCC_sHFCC 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:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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	<u>Date(s) of Evaluation</u> September 06, 2006	<u>Test Report Serial No.</u> 090106AL8-T771-S15B	<u>Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX E - SYSTEM VALIDATION

Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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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

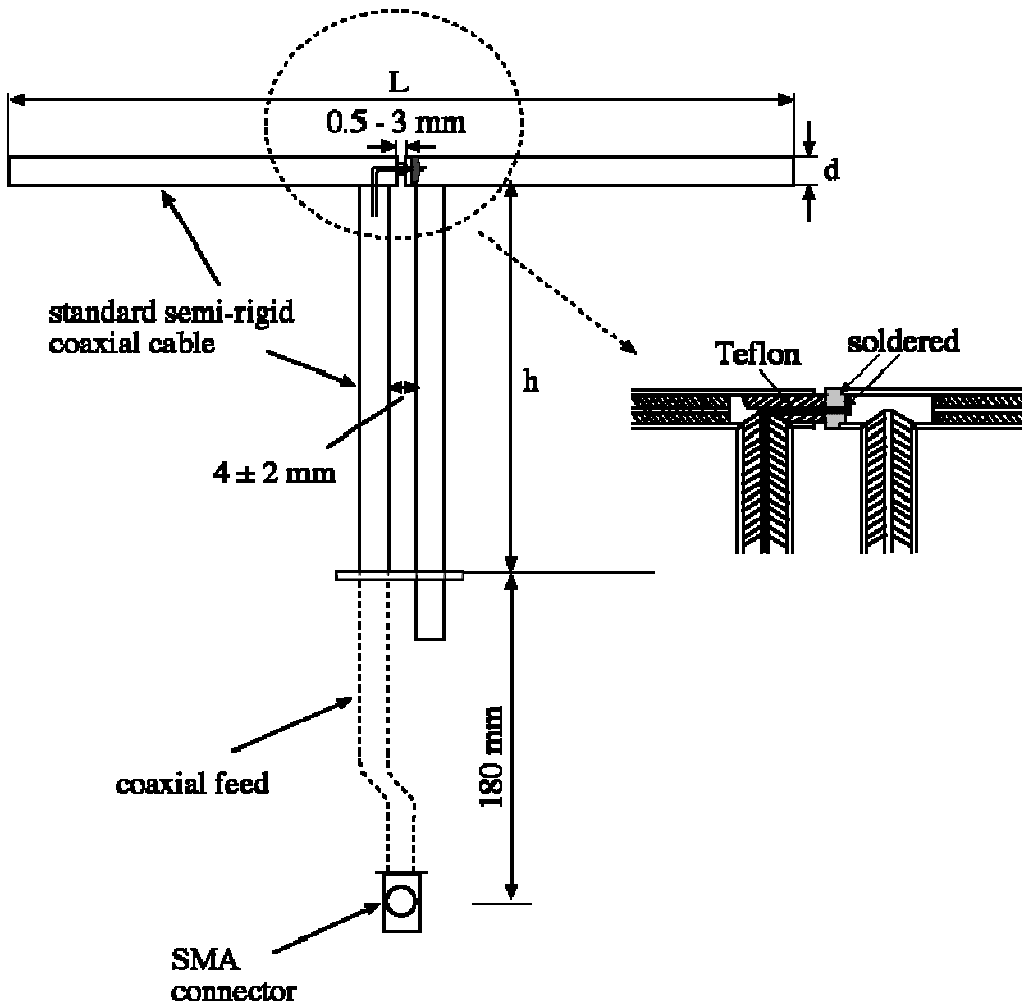
1. Dipole Construction & Electrical Characteristics

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:

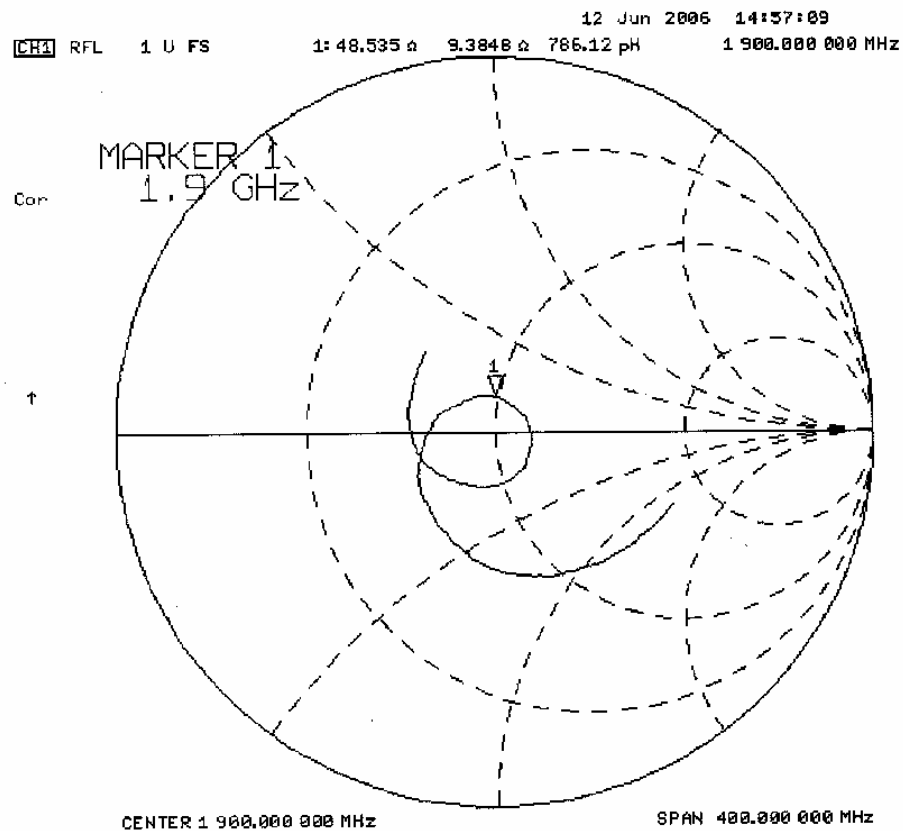
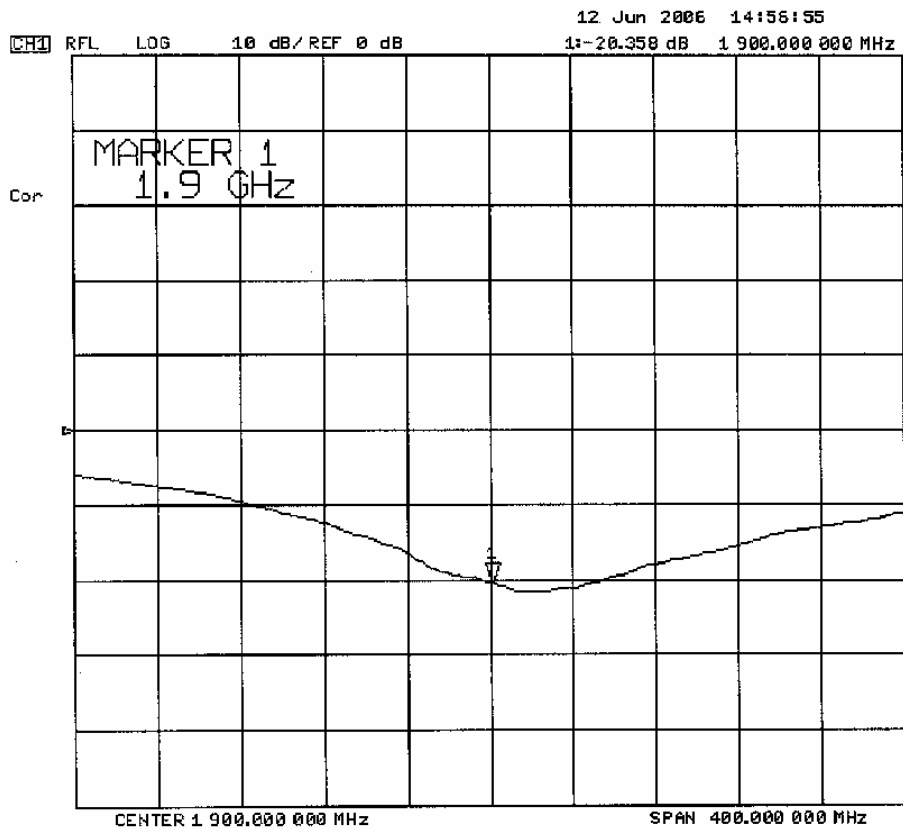
Feed point impedance at 1900MHz $Re\{Z\} = 48.535\Omega$

$Im\{Z\} = 9.3848\Omega$

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



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

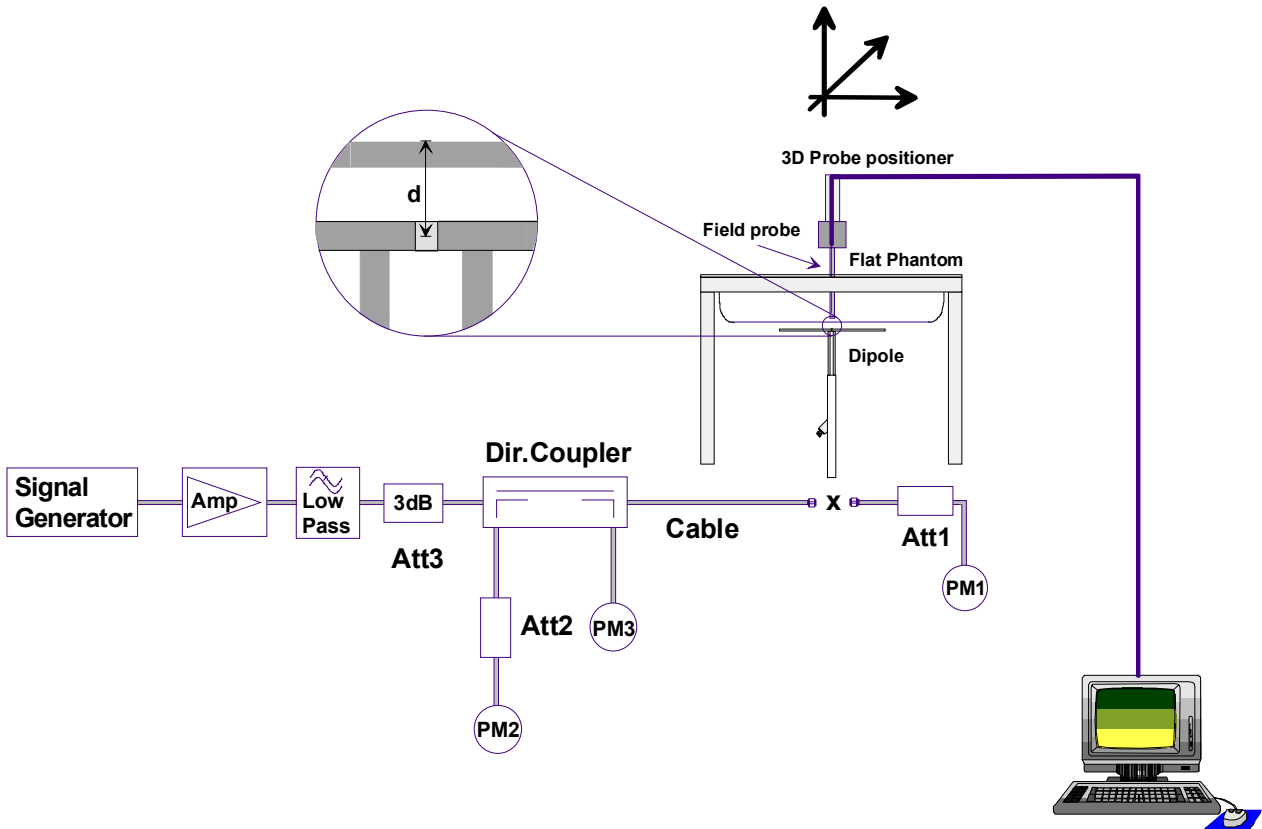
Environmental Conditions:
 Ambient Temperature: 23.2 °C
 Barometric Pressure: 101.2 kPa
 Humidity: 44%

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
Average	10.35	41.40	5.34	21.37	11.73

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.

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

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/m³)

- 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

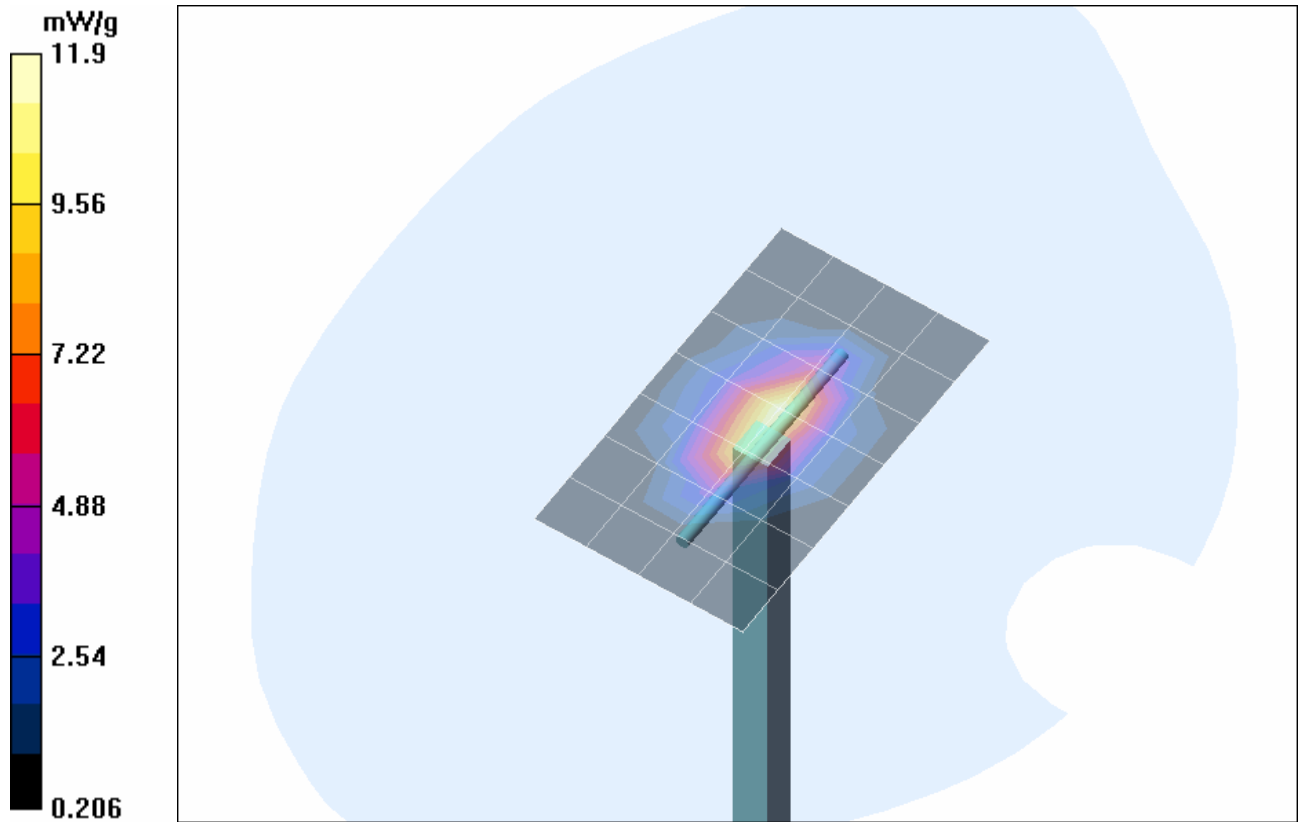
Maximum value of SAR (measured) = 11.6 mW/g

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

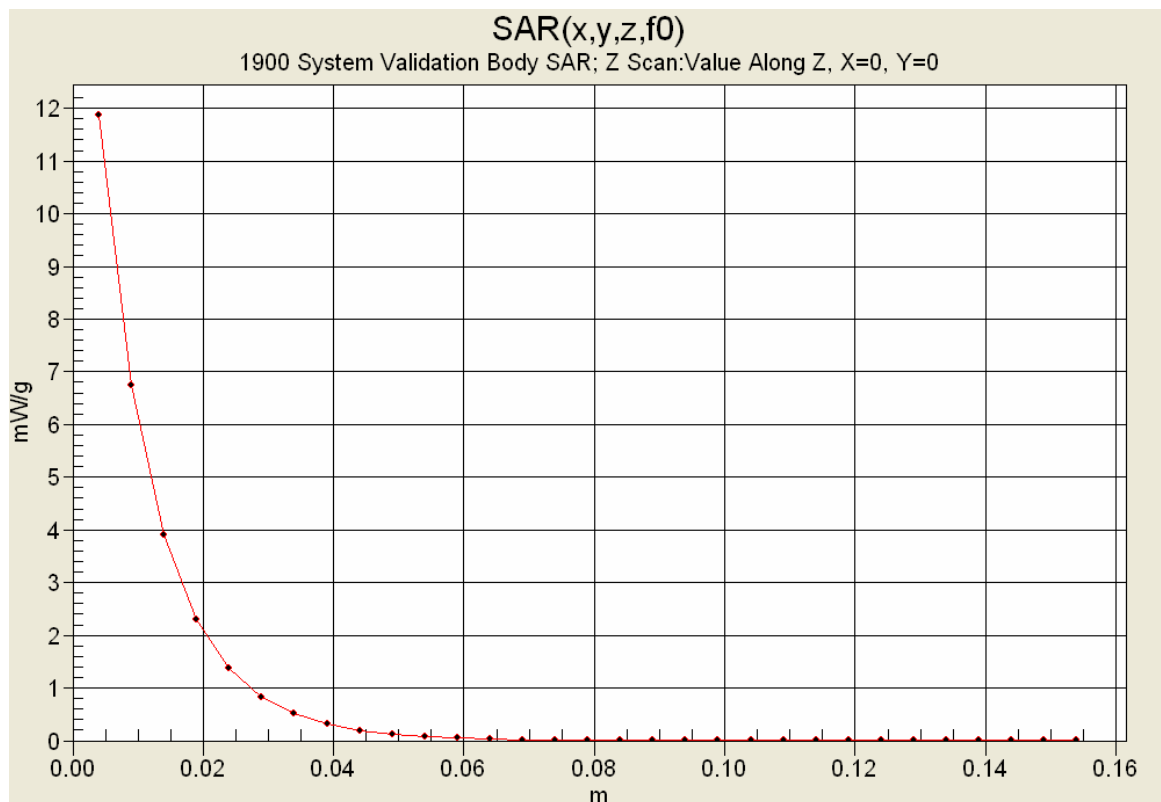
Reference Value = 89.2 V/m; Power Drift = -0.013 dB


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



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

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
1.9000	53.30	1.52	51.36	1.51
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-S15B	<u>Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX F - PROBE CALIBRATION

Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 34 of 35



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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE 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 8648C	US3642U01700	4-Aug-99 (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: **Katja Pokovic** Function: **Technical Manager** Signature:

Approved by: **Niels Kuster** Quality Manager

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 _{x,y,z}	sensitivity in free space
ConF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ 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_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * *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_{x,y,z}**: 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_{x,y,z} * *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 ± 50 MHz to ± 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 DASYS Systems

(Note: non-compatible with DASYS2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1387**Sensitivity in Free Space^A**

NormX	1.62 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.72 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.72 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression^B

DCP X	92 mV
DCP Y	92 mV
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 _{be} [%]	Without Correction Algorithm	9.3	5.0
SAR _{be} [%]	With Correction Algorithm	0.1	0.2

Sensor Offset

Probe Tip to Sensor Center 2.7 mm

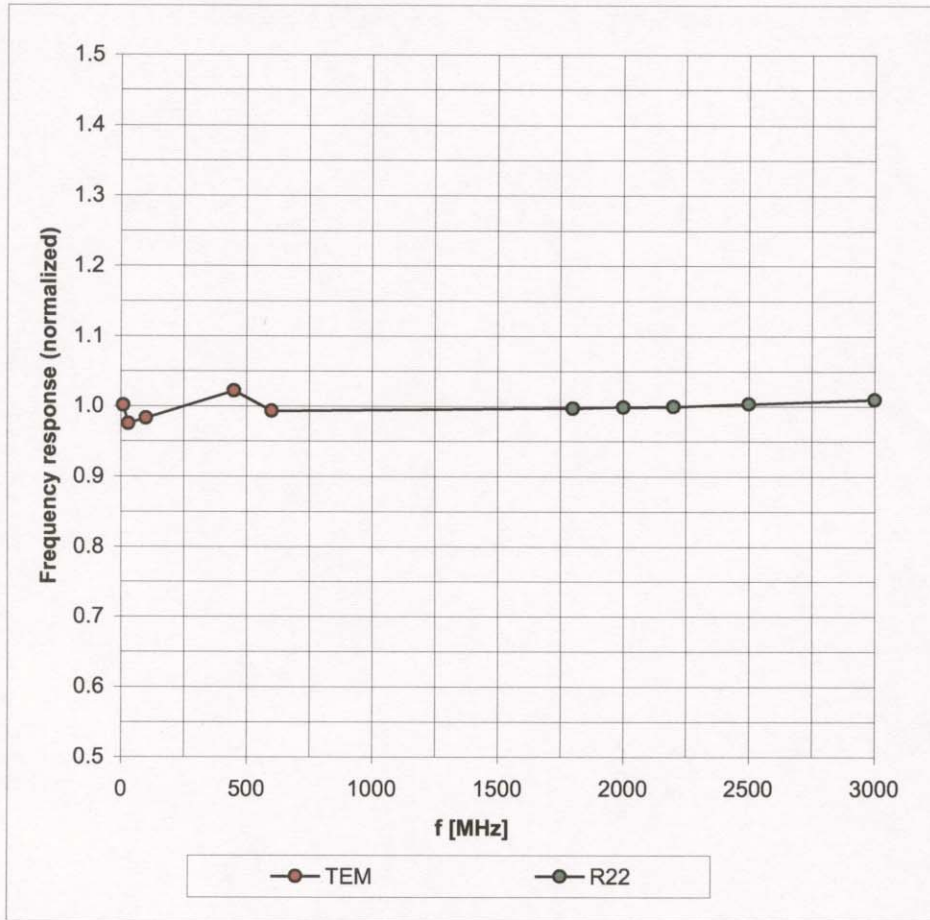
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

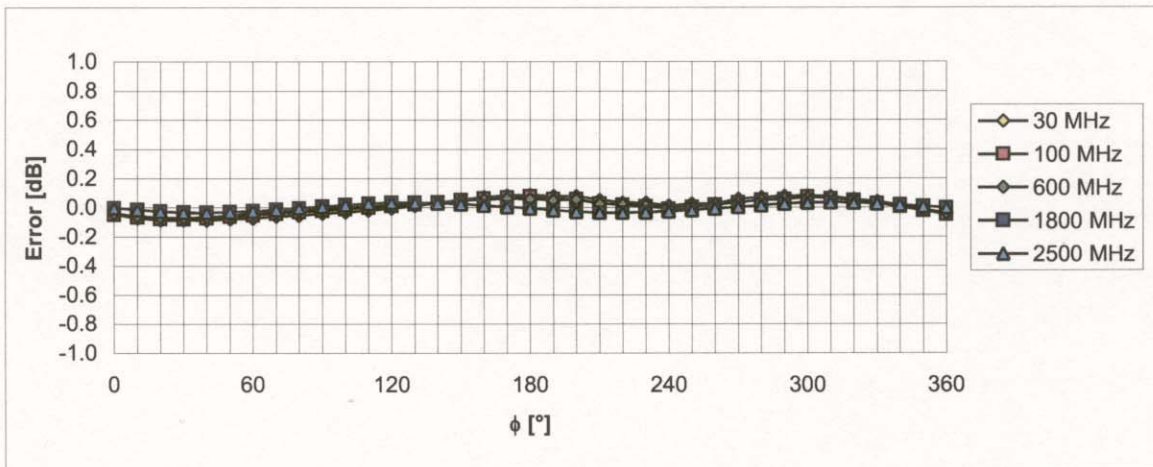
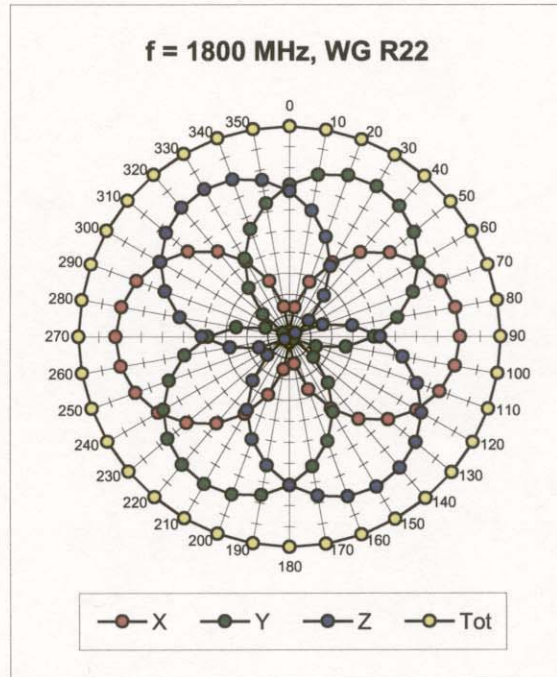
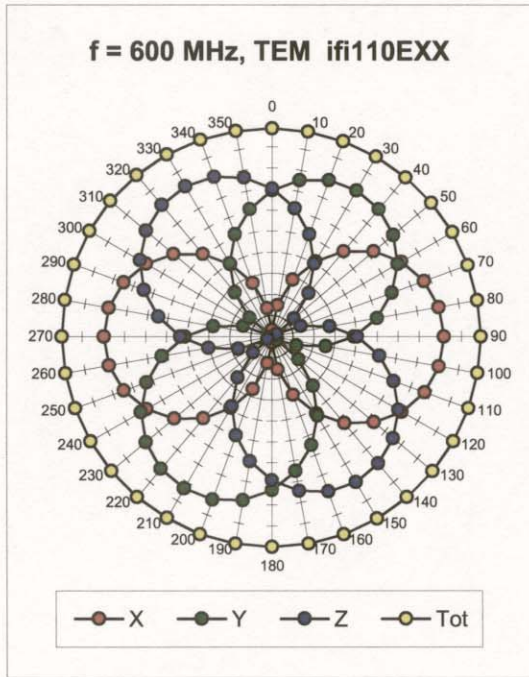
Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



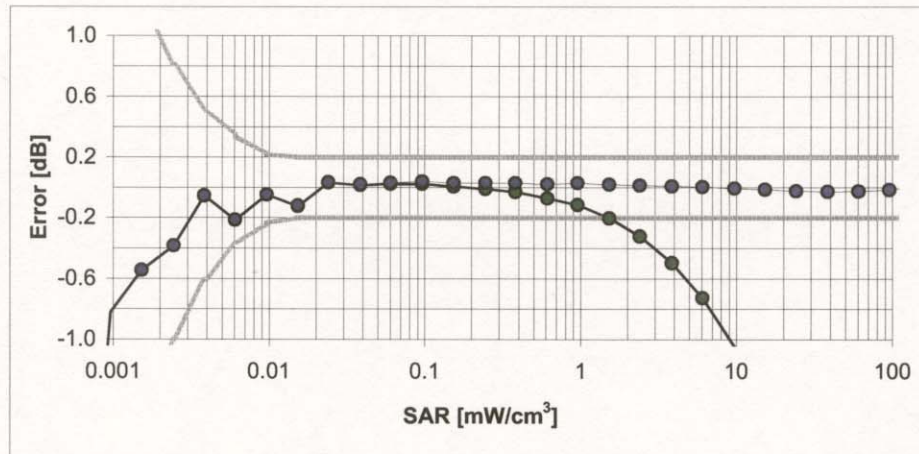
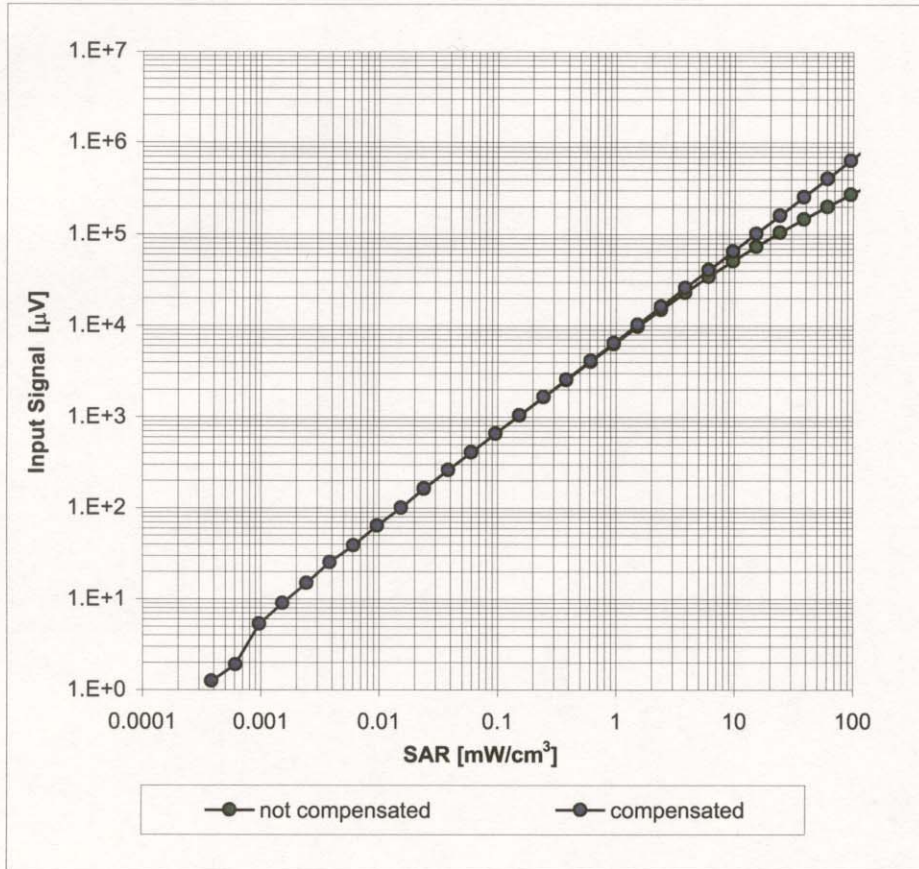
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$



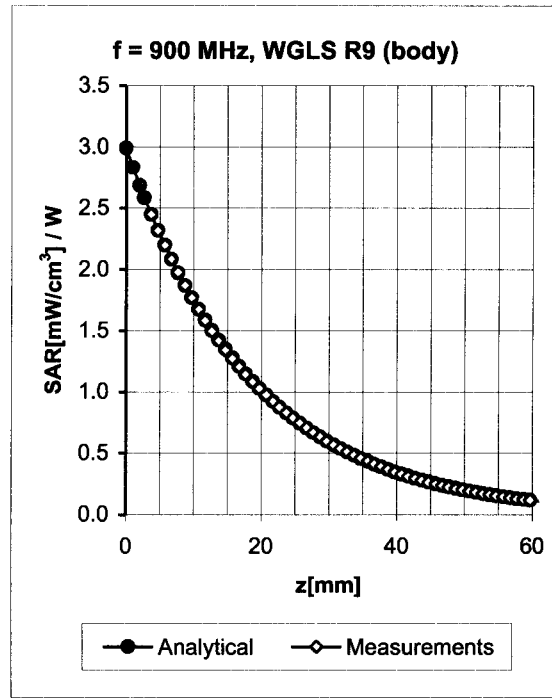
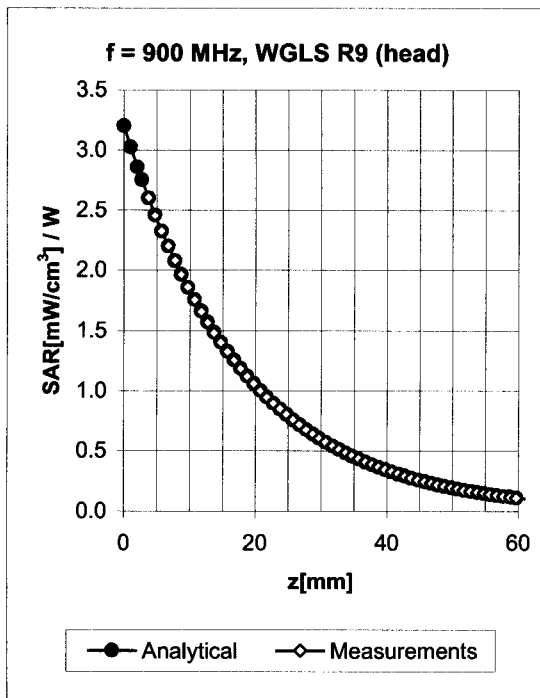
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

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



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

Conversion Factor Assessment

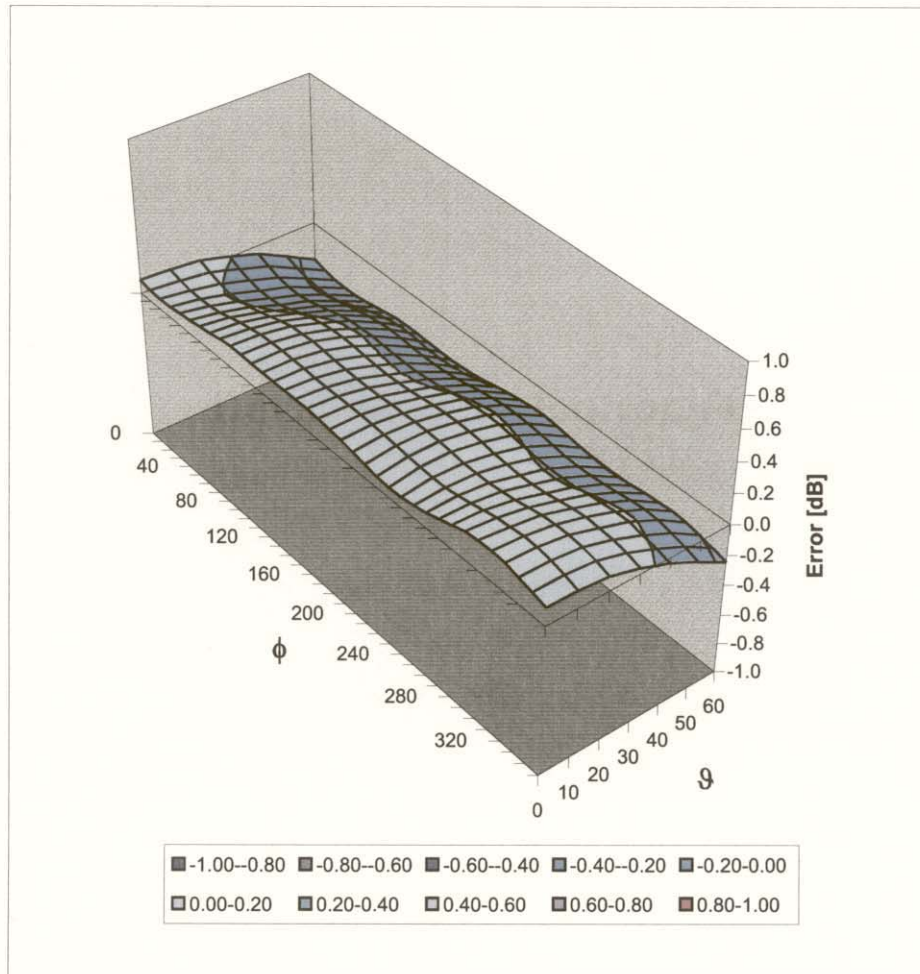


f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.62	1.86	6.35 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.59	1.97	6.04 ± 11.0% (k=2)

^c 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 (ϕ, ϑ), $f = 900$ 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:

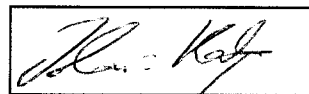
March 18, 2006

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-S15B	<u>Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Report Issue Date</u> October 05, 2006	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX G - SAM PHANTOM CERTIFICATE OF CONFORMITY

Company:	Plantronics Inc.	FCC ID:	AL8CA12CDXXXX	1921.536 - 1928.448 MHz	
Model(s):	CA12CD (Base)	Device:	Wireless Headset Adaptor (Base Unit)		
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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 50361
- [2] IEEE P1528-200x draft 6.5
- [3] IEC PT 62209 draft 0.9

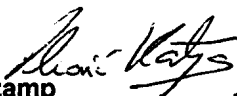
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

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**



Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79