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## **Appendix 4. Photographs**

This appendix contains the following photographs:

Photo Reference Number	Title
PHT/72327JD02/001	Test configuration for the measurement of Specific Absorption Rate (SAR)
PHT/72327JD02/002	Touch Left
PHT/72327JD02/003	Tilt Left
PHT/72327JD02/004	Touch Right
PHT/72327JD02/005	Tilt Right
PHT/72327JD02/006	Rear Of EUT Facing Phantom Open With PHF 15mm
PHT/72327JD02/007	Display Of EUT Facing Phantom Open With PHF 15mm
PHT/72327JD02/008	Rear Of EUT Facing Phantom Closed With PHF 15mm
PHT/72327JD02/009	Display Of EUT Facing Phantom Closed With PHF 15mm
PHT/72327JD02/010	Overall Setup
PHT/72327JD02/011	Display View Of EUT Closed
PHT/72327JD02/012	Rear View Of EUT Closed
PHT/72327JD02/013	Display View Of EUT Open
PHT/72327JD02/014	Rear View Of EUT Open
PHT/72327JD02/015	EUT Internal View
PHT/72327JD02/016	Battery View
PHT/72327JD02/017	PHF View
PHT/72327JD02/018	Fluid Level 1900 MSL
PHT/72327JD02/019	Fluid Level 1900 HSL

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PHT/72327JD02/001: SAR Configuration

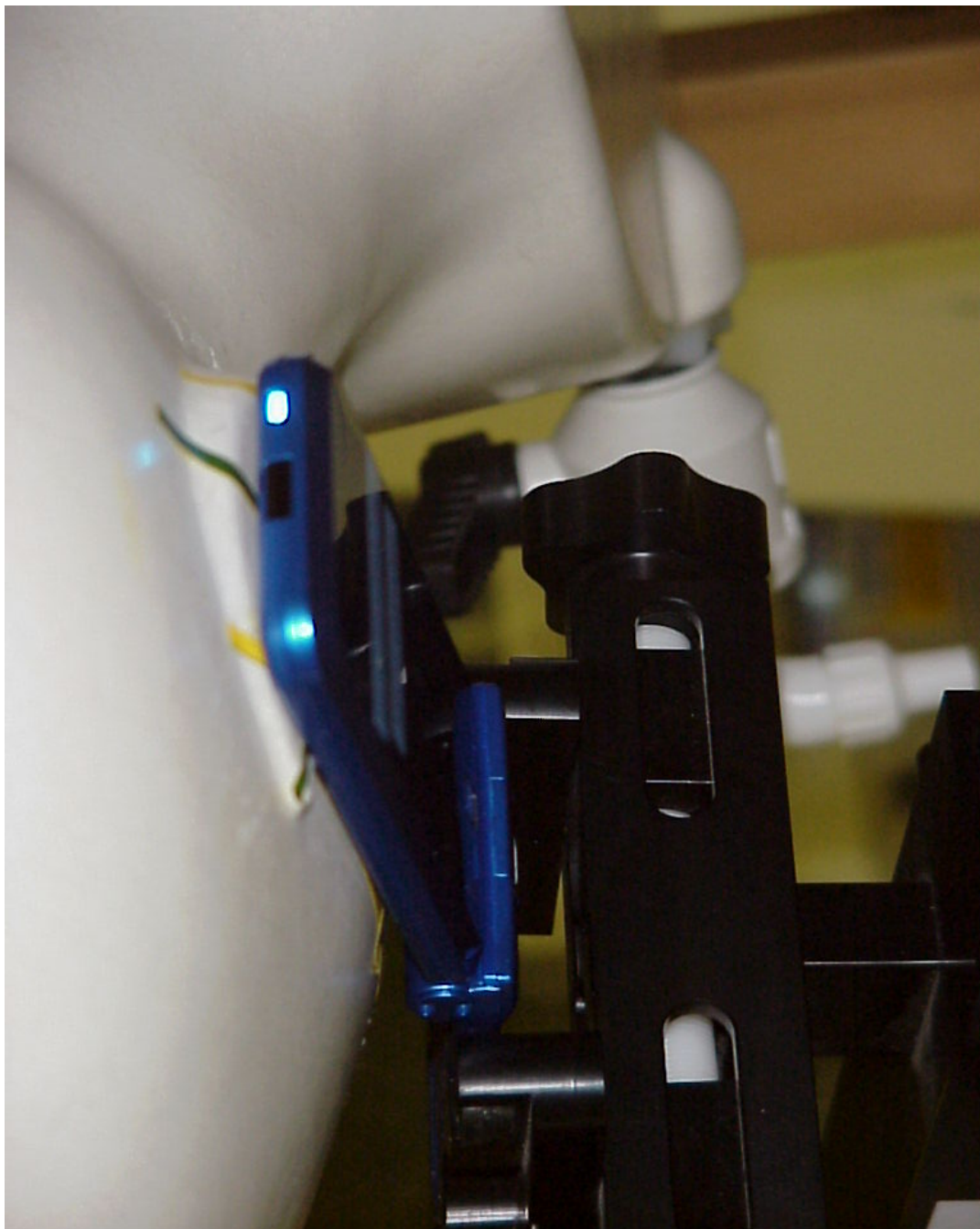


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PHT/72327JD02/002: Touch Left



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PHT/72327JD02/003: Tilt Left



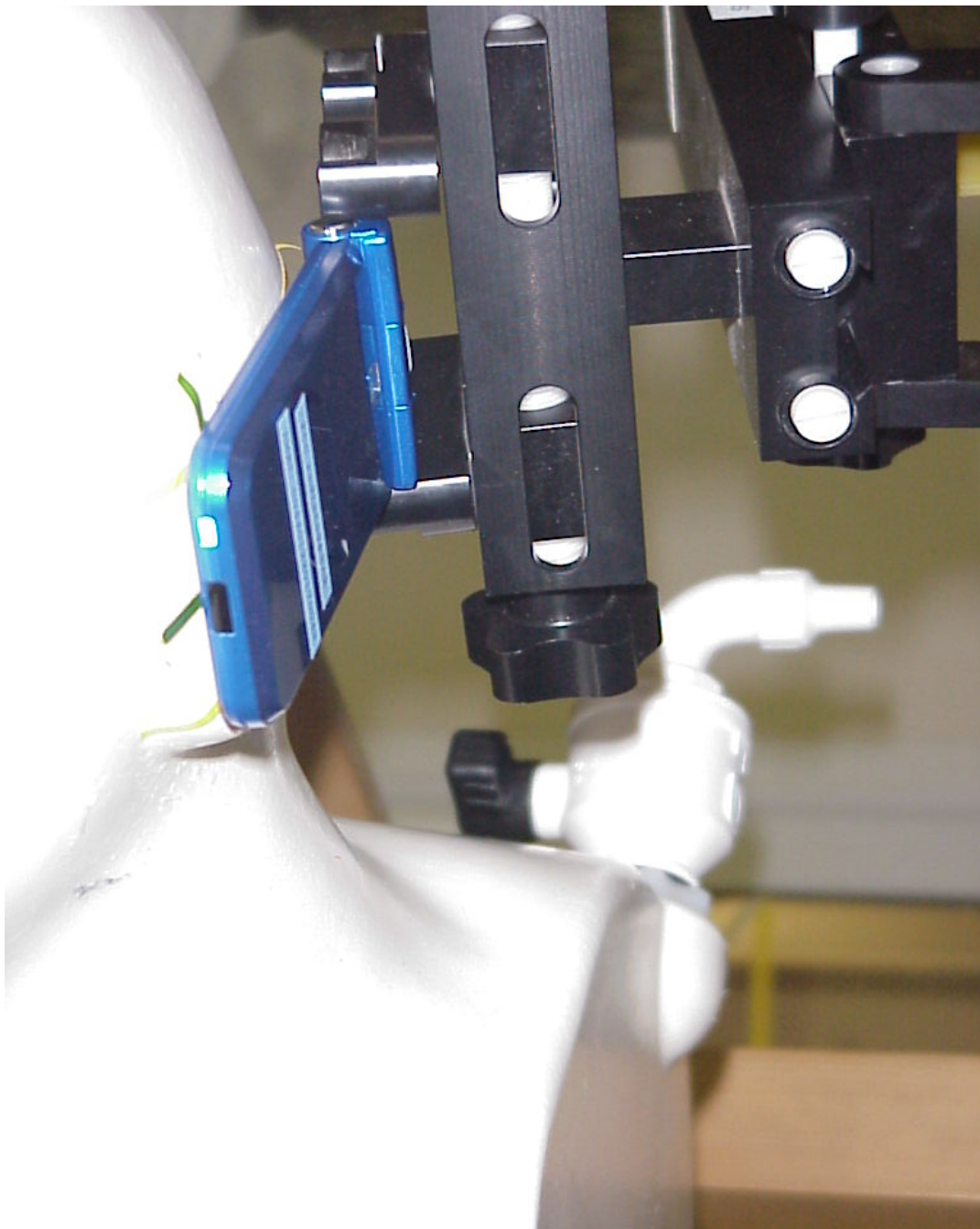


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PHT/72327JD02/004: Touch Right

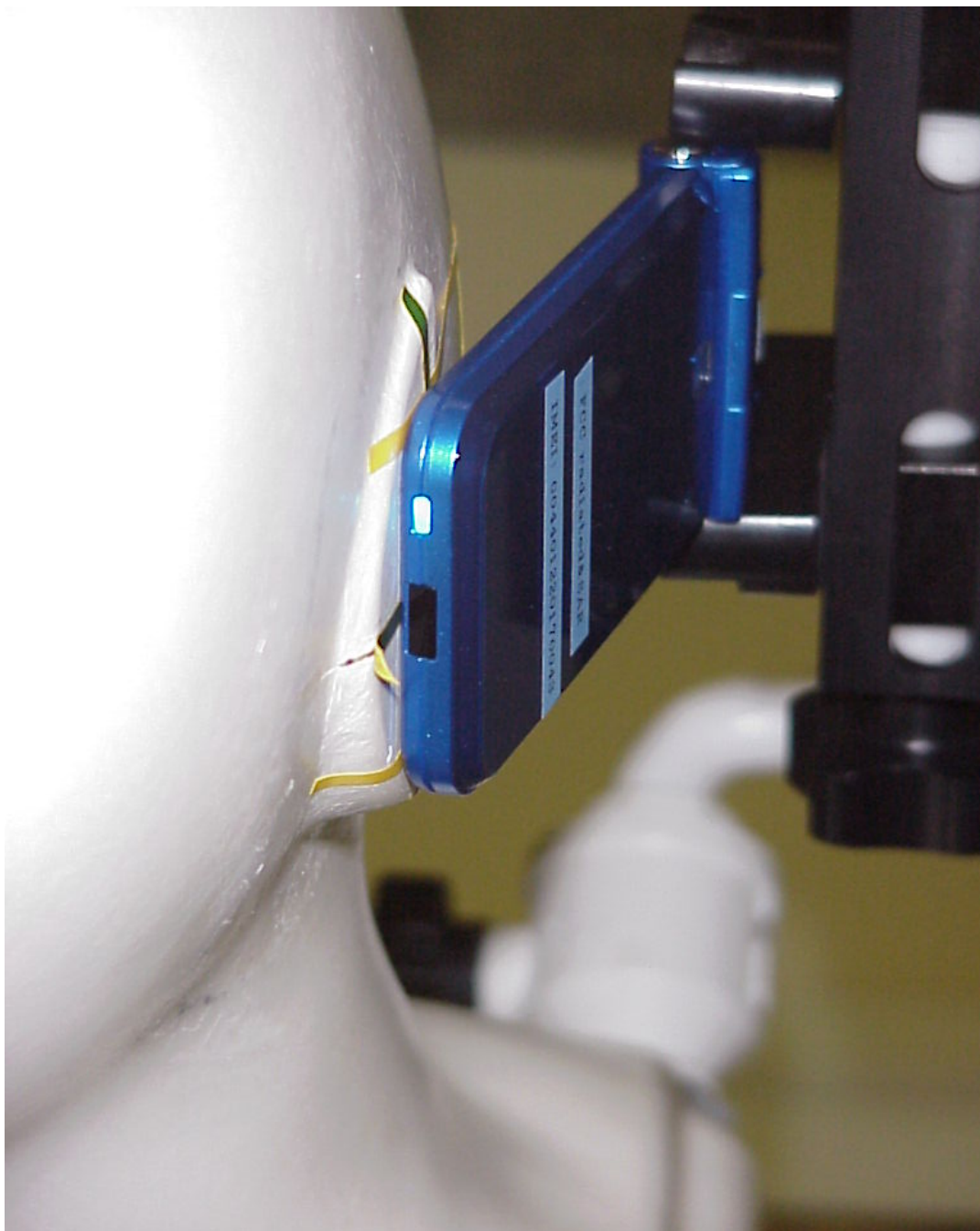


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PHT/72327JD02/005: Tilt Right



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PHT/72327JD02/006: Rear Of EUT Facing Phantom Open With PHF 15mm



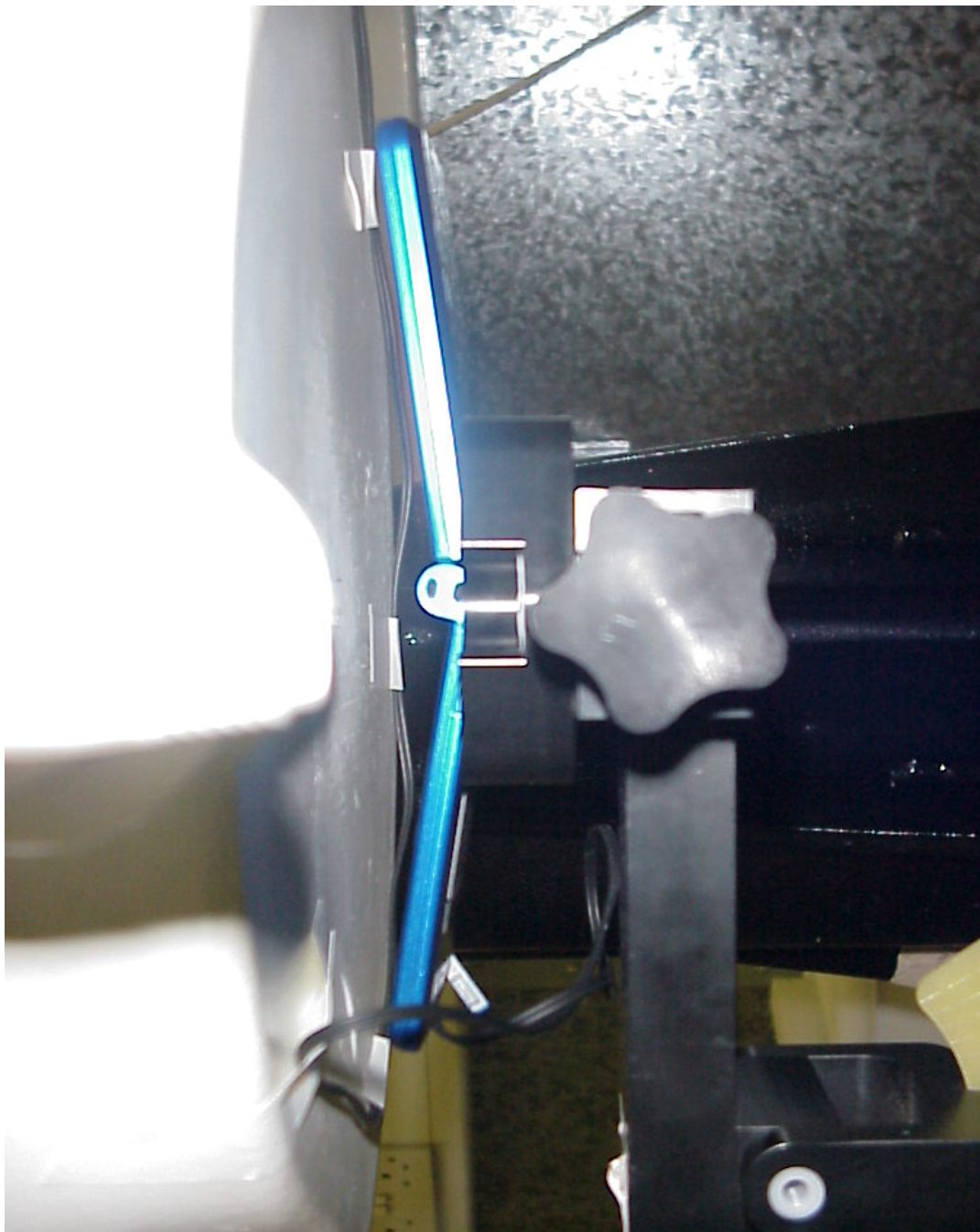


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PHT/72327JD02/007: Display Of EUT Facing Phantom Open With PHF 15mm





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PHT/72327JD02/008: Rear Of EUT Facing Phantom Closed With PHF 15mm



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PHT/72327JD02/009: Display Of EUT Facing Phantom Closed With PHF 15mm



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PHT/72327JD02/010: Overall Setup





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PHT/72327JD02/011: Display View Of EUT Closed





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### PHT/72327JD02/012: Rear View Of EUT Closed



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PHT/72327JD02/013: Display View Of EUT Open



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PHT/72327JD02/014: Rear View Of EUT Open





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PHT/72327JD02/015: EUT Internal View





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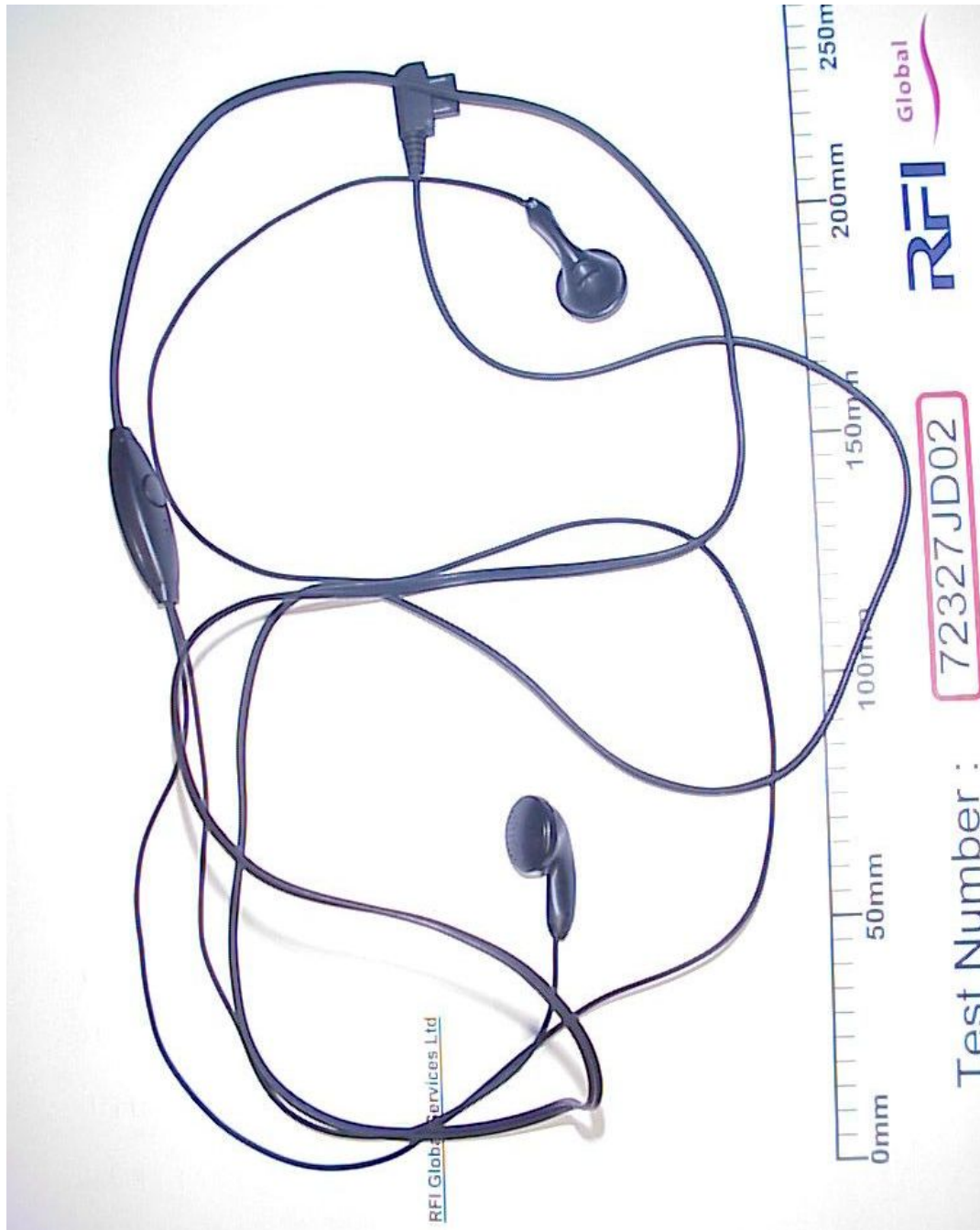
PHT/72327JD02/016: Battery View



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PHT/72327JD02/017: PHF View

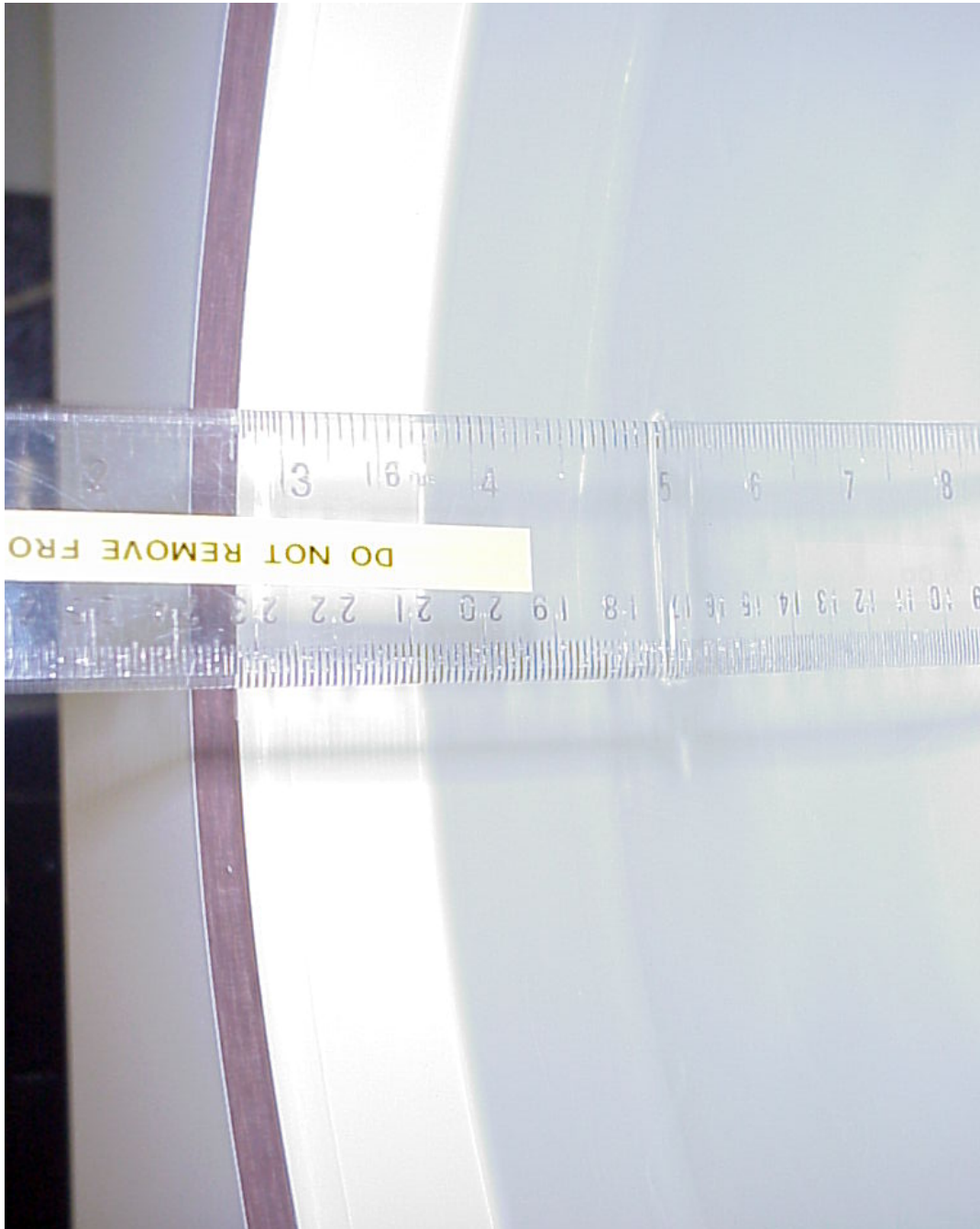


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PHT/72327JD02/018: Fluid Level 1900 MSL

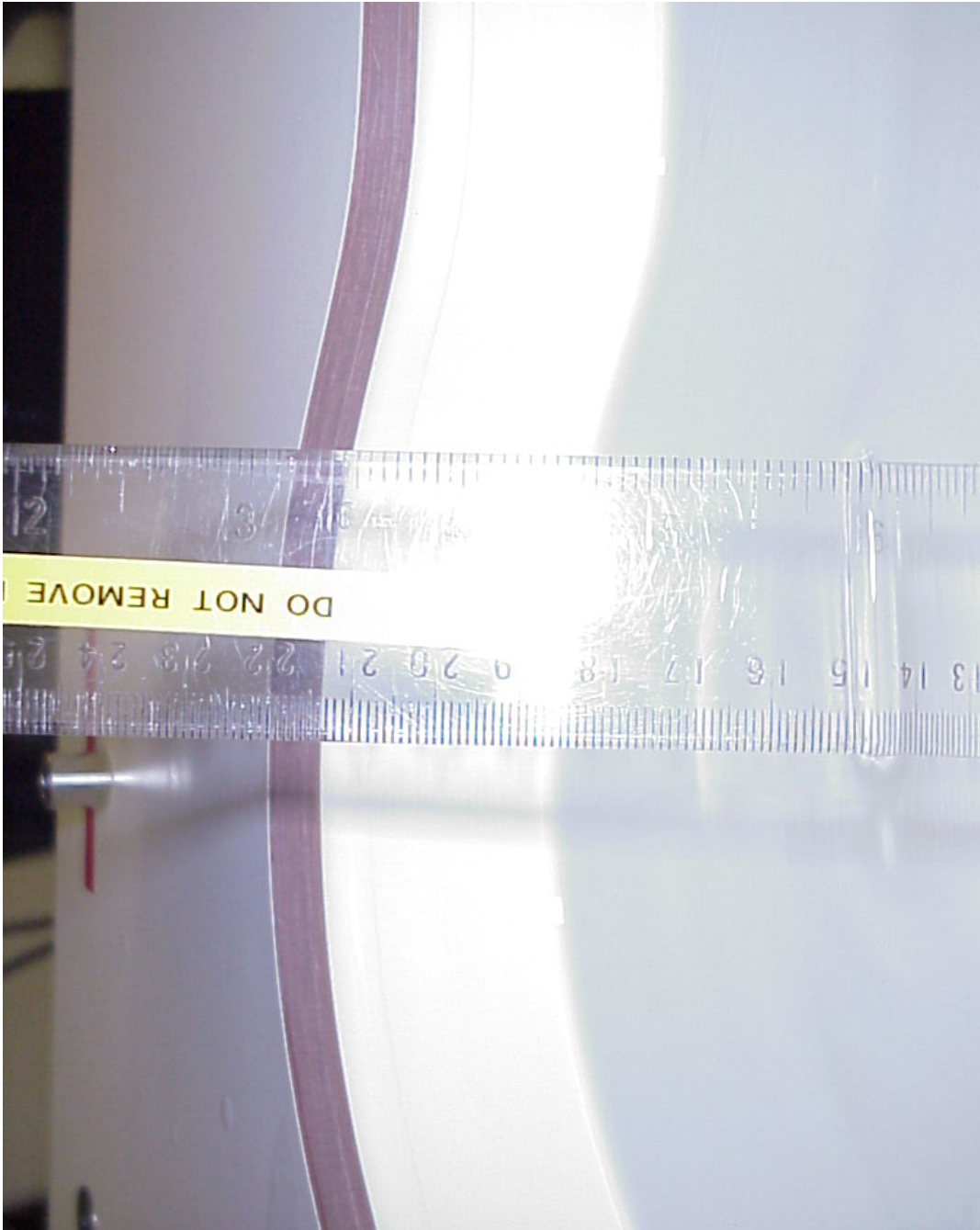


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PHT/72327JD02/019: Fluid Level 1900 HSL





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## **Appendix 5. Validation of System**

Prior to the assessment, the system was verified in the flat region of the phantom.  
A 1900 MHz dipole was used. A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of  $\pm 5\%$  for the 1900 MHz dipole. The applicable verification (normalised to 1 Watt).

**Date: 01 November 2006**

**Validation Dipole and Serial Number: D1900V2/SN: 540**

Stimulant	Frequency (MHz)	Room Temperature	Liquid Temperature	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	1900	24.0 to 23.0	25.0 to 24.0	$\epsilon_r$	40.00	39.83	-0.43	$\pm 5$
				$\sigma$	1.40	1.44	3.21	$\pm 5$
				1g SAR	38.10	36.72	-3.62	$\pm 5$

Stimulant	Frequency (MHz)	Room Temperature	Liquid Temperature	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	1900	24.0 to 23.0	23.0 to 23.0	$\epsilon_r$	53.30	51.68	-3.03	$\pm 5$
				$\sigma$	1.52	1.60	4.97	$\pm 5$
				1g SAR	39.10	39.60	1.28	$\pm 5$

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## **Appendix 6. Simulated Tissues**

The body mixture consists of water and glycol. Visual inspection is made to ensure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the tissue.

Ingredient	Frequency
	1900 MHz Head
De-Ionised Water	55.41%
DGMBE	44.51%
Salt	0.08%

Ingredient	Frequency
	1900 MHz Body
De-Ionised Water	69.79%
DGMBE	30.00%
Salt	0.20%

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## **Appendix 7. DASY4 System Details**

### **A.7.1. DASY4 SAR Measurement System**

RFI Global Services Ltd, SAR measurement facility utilises the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 system is comprised of the robot controller, computer, near-field probe, probe alignment sensor, and the SAM phantom containing brain or muscle equivalent material. 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. This is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. The data acquisition electronics (DAE) performs signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection etc. The DAE 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 PC plug-in card. The DAE3 utilises 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 PC-card 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. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

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#### **A.7.2. DASY4 SAR System Specifications**

##### **Robot System**

Positioner:	Stäubli Unimation Corp. Robot Model: RX90L
Repeatability:	0.025 mm
No. of Axis:	6
Serial Number:	F00/SD89A1/A/01
Reach:	1185 mm
Payload:	3.5 kg
Control Unit:	CS7
Programming Language:	V+

##### **Data Acquisition Electronic (DAE) System**

##### **Cell Controller**

PC:	Dell Precision 340
Operating System:	Windows NT
Data Card:	DASY4 Measurement Server
Serial Number:	1080

##### **Data Converter**

Features:	Signal Amplifier, multiplexer, A/D converted and control logic.
Software:	DASY4 Software
Connecting Lines:	Optical downlink for data and status info. Optical uplink for commands and clock.

##### **PC Interface Card**

Function:	24 bit (64 MHz) DSP for real time processing Link to DAE3 16 bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot.
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### DASY4 SAR System Specifications (Continued)

#### E-Field Probe

Model:	ET3DV6
Serial No:	1528
Construction:	Triangular core fibre optic detection system
Frequency:	10 MHz to 3 GHz
Linearity:	±0.2 dB (30 MHz to 3 GHz)
Probe Length (mm):	337
Probe Diameter (mm):	12
Tip Length (mm):	10
Tip Diameter (mm):	6.8
Sensor X Offset (mm):	2.7
Sensor Y Offset (mm):	2.7
Sensor Z Offset (mm):	2.7

#### Phantom

Phantom:	SAM Phantom
Shell Material:	Fibreglass
Thickness:	2.0 ±0.1 mm

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