

Appendix 4. Photographs

This appendix contains the following photographs:

Photo Reference Number	Title
PHT/83316JD01/001	Test configuration for the measurement of Specific Absorption Rate (SAR)
PHT/83316JD01/002	Touch Left
PHT/83316JD01/003	Tilt Left
PHT/83316JD01/004	Touch Right
PHT/83316JD01/005	Tilt Right
PHT/83316JD01/006	Front of EUT Closed Facing Phantom
PHT/83316JD01/007	Rear of EUT Closed Facing Phantom
PHT/83316JD01/008	Front of EUT Open Facing Phantom
PHT/83316JD01/009	Rear of EUT Open Facing Phantom
PHT/83316JD01/010	General Set Up of EUT with PHF
PHT/83316JD01/011	Front of EUT Closed View
PHT/83316JD01/012	Rear of EUT Closed View
PHT/83316JD01/013	Front of EUT Open View
PHT/83316JD01/014	Rear of EUT Open View
PHT/83316JD01/015	Internal view of EUT
PHT/83316JD01/016	Battery View
PHT/83316JD01/017	PHF View
PHT/83316JD01/018	PHF Converter View
PHT/83316JD01/019	900 MHz Head Fluid Level
PHT/83316JD01/020	900 MHz Body Fluid Level
PHT/83316JD01/021	1900 MHz Head Fluid Level
PHT/83316JD01/022	1900 MHz Body Fluid Level

PHT/83316JD01/001: Test configuration for the measurement of Specific Absorption Rate (SAR)



PHT/83316JD01/002: Touch Left



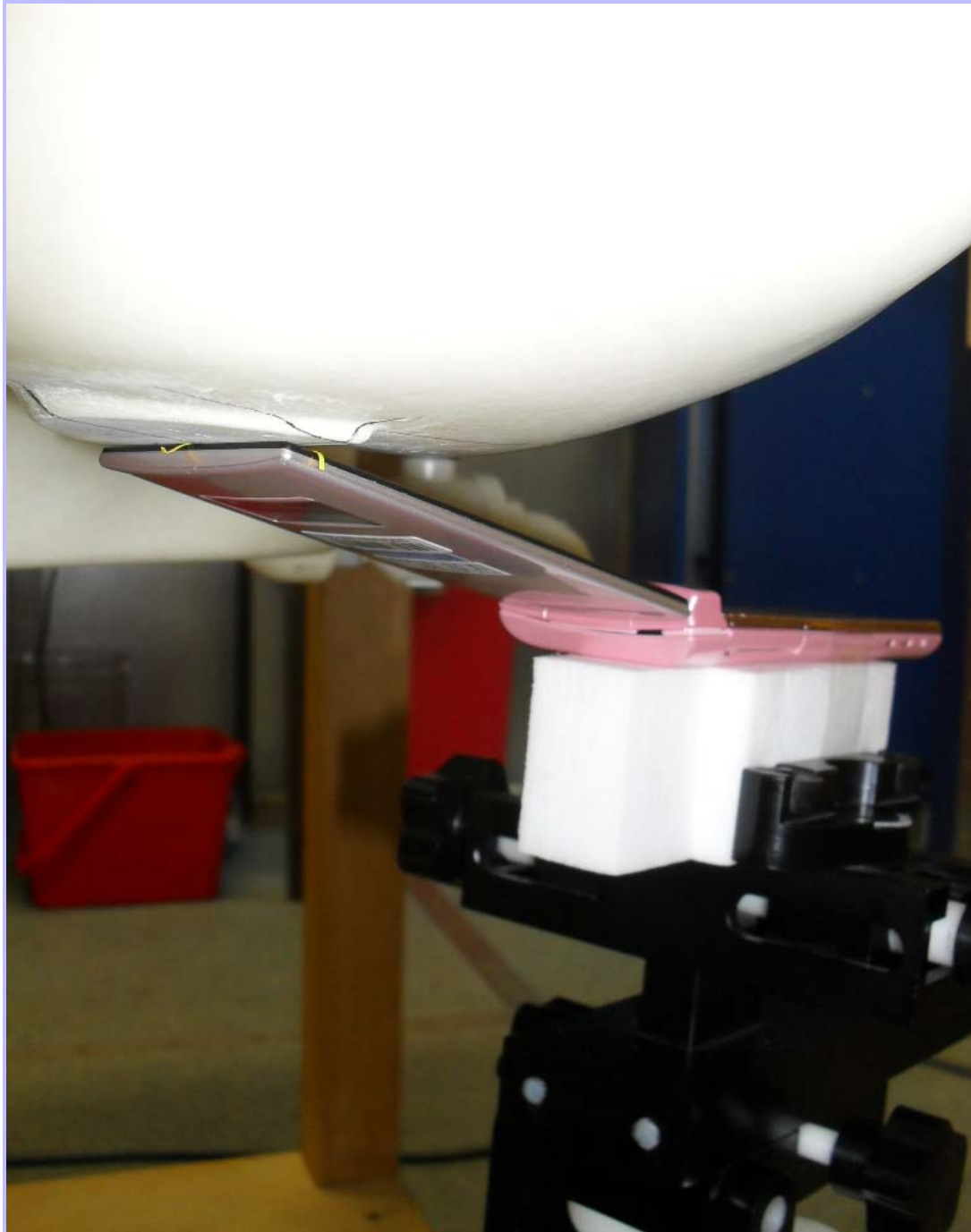
PHT/83316JD01/003: Tilt Left



PHT/83316JD01/004: Touch Right



PHT/83316JD01/005: Tilt Right



PHT/83316JD01/006: Front of EUT Closed Facing Phantom



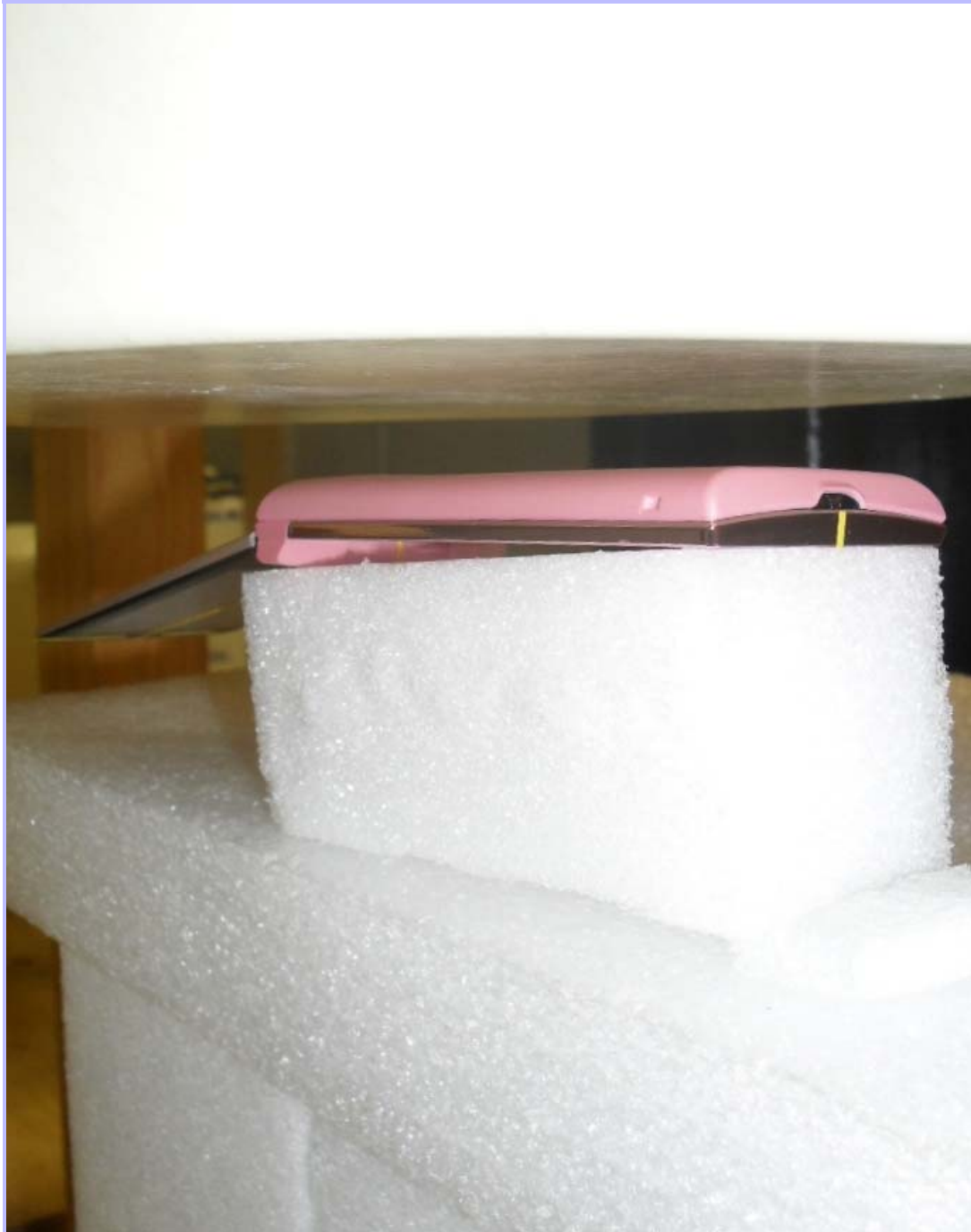
PHT/83316JD01/007: Rear of EUT Closed Facing Phantom



PHT/83316JD01/008: Front of EUT Open Facing Phantom



PHT/83316JD01/009: Rear of EUT Open Facing Phantom



PHT/83316JD01/010: General Set Up of EUT with PHF



PHT/83316JD01/011: Front of EUT Closed View



PHT/83316JD01/012: Rear of EUT Closed View



PHT/83316JD01/013: Front of EUT Open View



PHT/83316JD01/014: Rear of EUT Open View



PHT/83316JD01/015: Internal view of EUT



PHT/83316JD01/016: Battery View



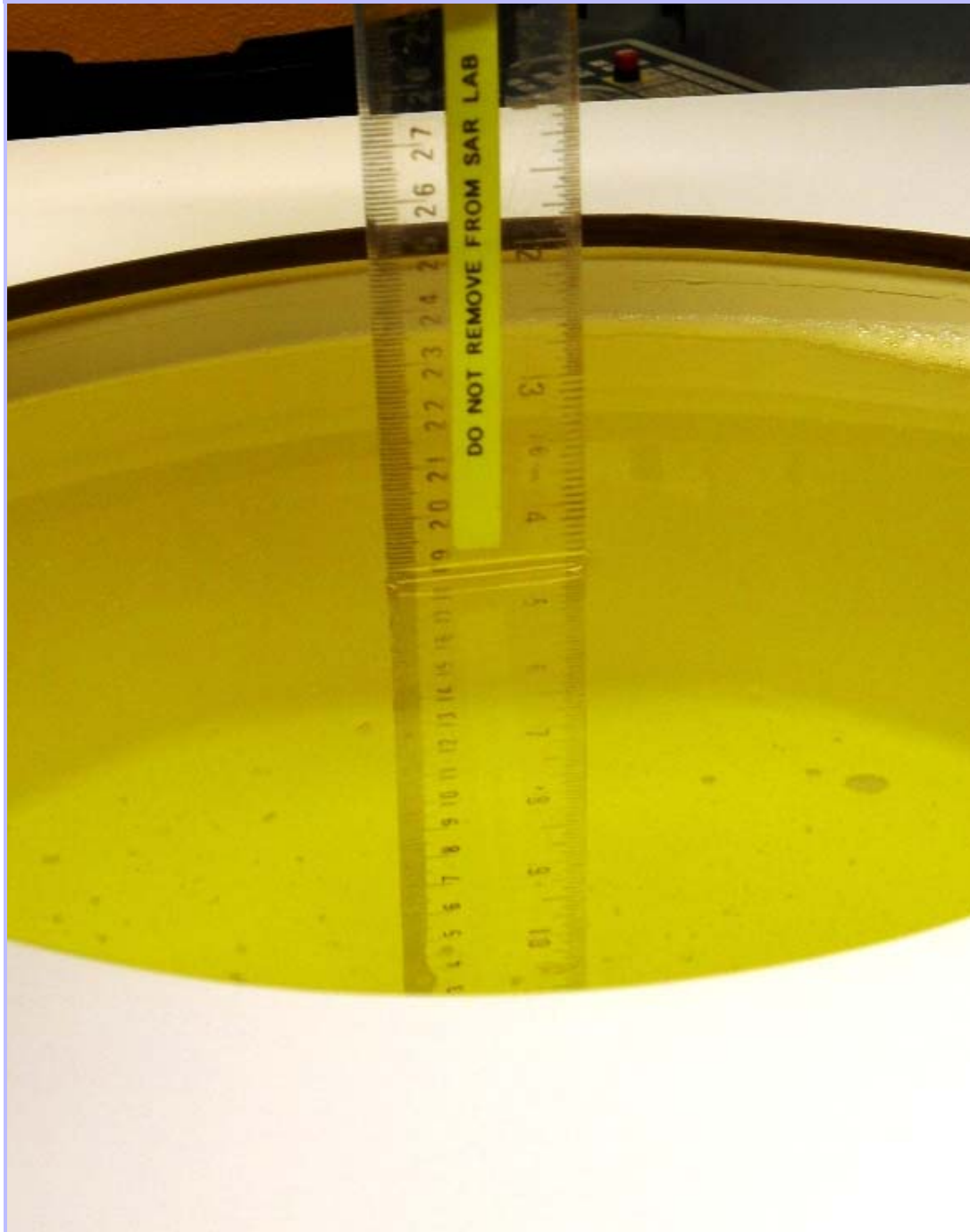
PHT/83316JD01/017: PHF View



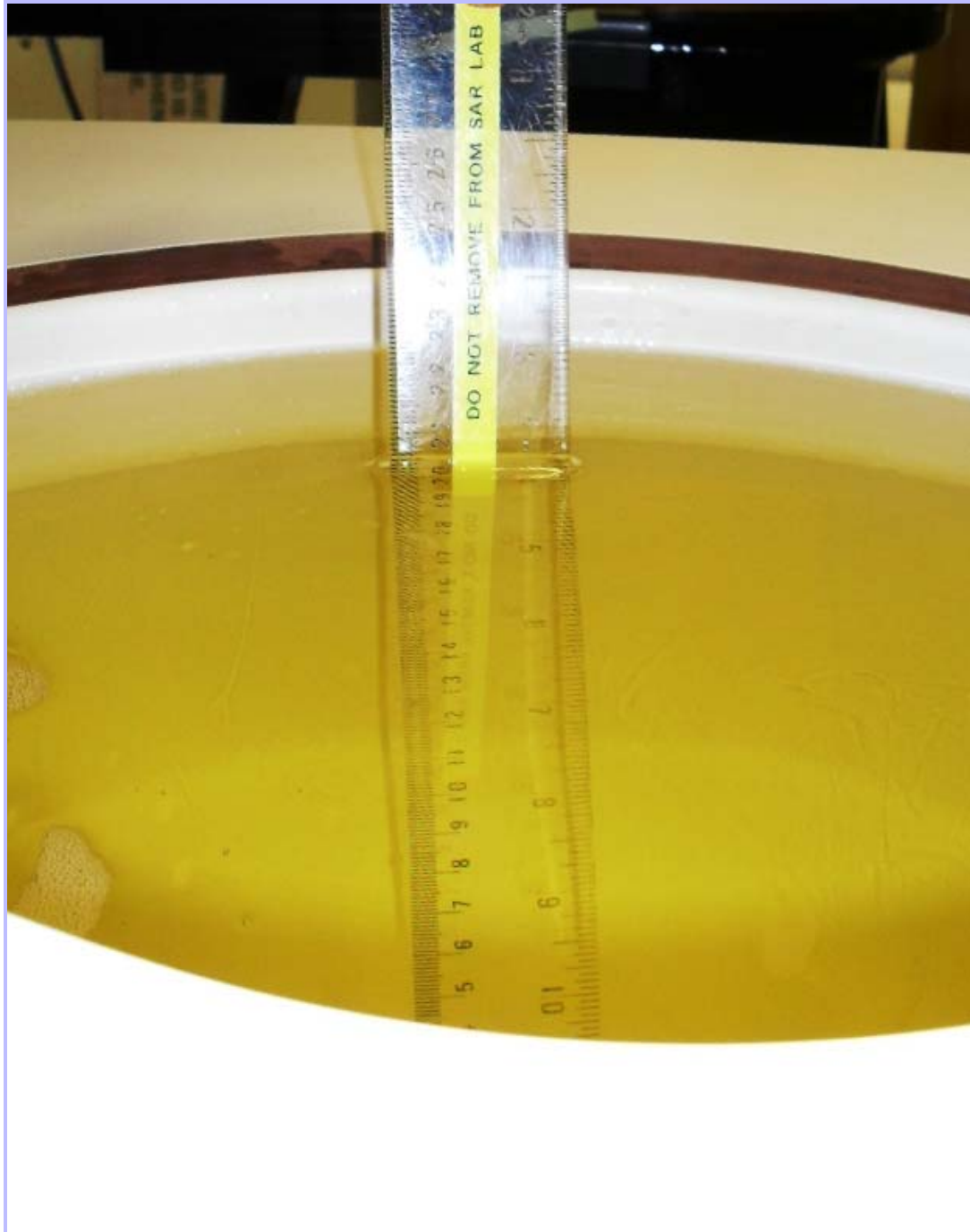
PHT/83316JD01/018: PHF Converter View



PHT/83316JD01/019: 900 MHz Head Fluid Level



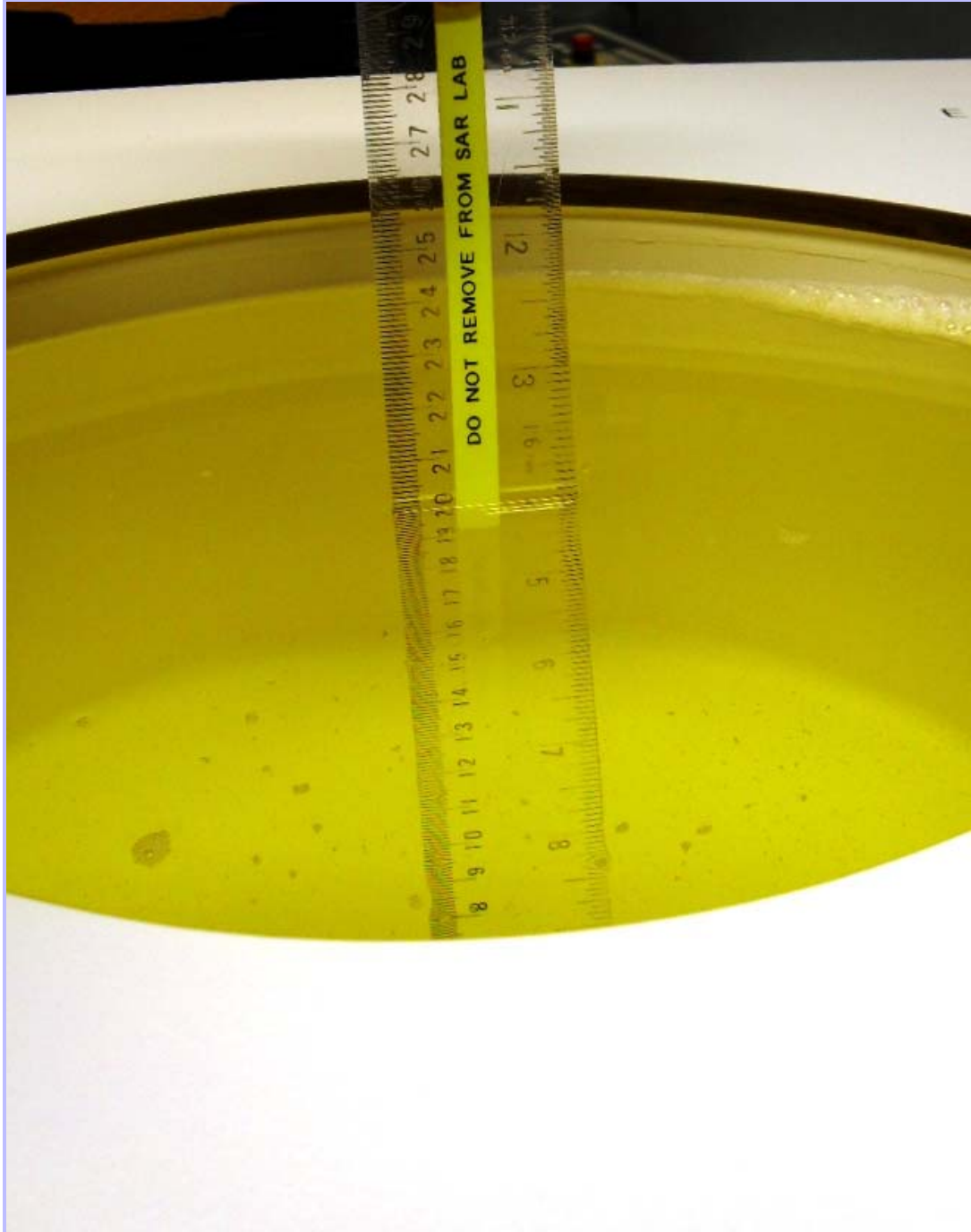
PHT/83316JD01/020: 900 MHz Body Fluid Level



PHT/83316JD01/021:1900 MHz Head Fluid Level



PHT/83316JD01/022:1900 MHz Body Fluid Level



Appendix 5. Validation of System

Prior to the assessment, the system was verified in the flat region of the phantom. A 900MHz and 1900MHz 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 900MHz and 1900MHz dipole.

The applicable verification normalised to 1 Watt.

Date: 23/08/2011

Validation Dipole and Serial Number: D1900V2; SN: 540

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	1900	23.0°C	22.1°C	ϵ_r	40.00	38.89	-2.78	5.00
				σ	1.40	1.42	1.24	5.00
				1g SAR	40.30	40.80	1.24	5.00
				10g SAR	21.00	21.32	1.52	5.00

Dielectrics for Frequencies Tested

Channel Number	Channel Description	Frequency (MHz)	Parameters	
512	Low	1850.2	ϵ_r	39.10
			σ	1.38
660	Middle	1879.8	ϵ_r	39.0
			σ	1.40
810	High	1909.8	ϵ_r	38.90
			σ	1.43

Date: 24/08/2011

Validation Dipole and Serial Number: D1900V2; SN:540

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	1900	23.0 °C	22.5 °C	ϵ_r	53.30	52.35	-1.78	5.00
				σ	1.52	1.58	4.12	5.00
				1g SAR	40.70	41.20	1.23	5.00
				10g SAR	21.60	21.60	0.00	5.00

Dielectrics for Frequencies Tested

Channel Number	Channel Description	Frequency (MHz)	Parameters	
512	Low	1850.2	ϵ_r	52.50
			σ	1.54
660	Middle	1879.8	ϵ_r	52.40
			σ	1.57
810	High	1909.8	ϵ_r	52.30
			σ	1.59

Date: 02/09/2011
Validation Dipole and Serial Number: D900V2; SN: 124

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Head	900	23.0 °C	23.0 °C	ϵ_r	41.50	41.40	-0.25	5.00
				σ	0.97	0.94	-2.97	5.00
				1g SAR	11.00	10.52	-4.36	5.00
				10g SAR	7.01	6.88	-1.85	5.00

Dielectrics for Frequencies Tested

Channel Number	Channel Description	Frequency (MHz)	Parameters	
1013	Low	824.7	ϵ_r	41.80
			σ	0.89
384	Middle	836.57	ϵ_r	41.70
			σ	0.90
777	High	848.31	ϵ_r	41.60
			σ	0.91

Date: 02/09/2011
Validation Dipole and Serial Number: D900V2; SN: 124

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	23.0 °C	22.7 °C	ϵ_r	55.00	54.95	-0.10	5.00
				σ	1.05	1.06	0.80	5.00
				1g SAR	11.10	11.52	3.78	5.00
				10g SAR	7.14	7.48	4.76	5.00

Dielectrics for Frequencies Tested

Channel Number	Channel Description	Frequency (MHz)	Parameters	
1013	Low	824.7	ϵ_r	55.30
			σ	1.01
384	Middle	836.57	ϵ_r	55.20
			σ	1.02
777	High	848.31	ϵ_r	55.20
			σ	1.03

Appendix 6. Simulated Tissues

The body mixture consists of de-ionised water, Polysorbate 20 and salt. 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
	835/850/900 MHz Head
De-Ionized Water	52.87
Polysorbate 20 (Tween 20)	46.10
Salt	1.03

Ingredient	Frequency
	835/850/900 MHz Body
De-Ionized Water	71.30
Polysorbate 20 (Tween 20)	28.00
Salt	0.70

Ingredient	Frequency
	1800/1900 MHz Head
De-Ionized Water	55.40
Polysorbate 20 (Tween 20)	44.22
Salt	0.38

Ingredient	Frequency
	1800/1900 MHz Body
De-Ionized Water	71.50
Polysorbate 20 (Tween 20)	28.00
Salt	0.50

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.

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	
Serial Number:	DAE3 SN:450
PC Controller	
PC:	Dell Precision 340
Operating System:	Windows 2000
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 nit A/D converter for surface detection system serial link to robot direct emergency stop output for robot.

DASY4 SAR System Specifications (Continued)	
E-Field Probe	
Model:	ET3DV6
Serial No:	1611
Construction:	Triangular core
Frequency:	735 MHz to >2.55 GHz
Linearity:	±0.2 dB (735 MHz to 2.55 GHz)
Probe Length (mm):	337
Probe Diameter (mm):	10
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