CERTIFICATE OF COMPLIANCE
SAR EVALUATION

Test Lab:	**Applicant Information:**
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FCC Rule Part(s):	**2.1093; ET Docket 96.326**
FCC ID:	**O6YUTS-708SY**
Model(s):	**UTS-708SY**
Equipment Type:	**Single-Mode PCS TDMA Phone**
Classification:	**Part 24 Licensed Portable Transmitter Held to Ear (PCE)**
Tx Frequency Range:	**1893.65 - 1909.95 MHz**
Output Power Tested:	**16.1mW EIRP (Avg.)**
Antenna Type:	**Retractable Whip**

Celltech Research Inc. declares under its sole responsibility that this device was found to be in compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in OET Bulletin 65, Supplement C, Edition 01-01 (General Population/Uncontrolled Exposure), and was tested in accordance with the appropriate measurement standards, guidelines, and recommended practices specified in American National Standards Institute C95.1-1992.

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 Research Inc. The results and statements contained in this report pertain only to the device(s) evaluated.

Shawn McMillen
General Manager
Celltech Research Inc.

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1.0 INTRODUCTION

This measurement report shows compliance of the UTSTARCOM INC. Model: UTS-708SY Single-Mode PCS TDMA Phone FCC ID: O6YUTS-708SY with FCC Part 2.1093, ET Docket 96-326 Rules for mobile and portable devices. The test procedures, as described in American National Standards Institute C95.1-1992 (see reference [1]), and FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [2]) were employed. A description of the product and 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 Equipment Under Test (EUT)

EUT Type	PCS TDMA Phone	**FCC ID**	O6YUTS-708SY
Equipment Class	Part 24 Licensed Portable Transmitter Held to Ear (PCE)	**Model No.(s)**	UTS-708SY
FCC Rule Part(s)	§ 2.1093, Docket 96-326	**Application Type**	Part 24 Certification
Tx Frequency Range (MHz)	1893.65 - 1909.95	**S/N No.**	Pre-production
Modulation	TDMA	**RF Output Power Tested**	16.1 mW EIRP (Avg.)
Antenna Type	Retractable Whip	**Battery Type(s)**	3.6V 400mAh Li-ion Battery


Front of EUT


Back of EUT


Left of EUT


Right of EUT

3.0 SAR MEASUREMENT SYSTEM

Celltech Research SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY system is comprised of the robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain 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 PC plug-in card. The DAE3 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 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, which are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

DASY3 SAR Measurement System with SAM Phantom

4.0 MEASUREMENT SUMMARY

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the EUT are reported in Appendix A.

HEAD SAR MEASUREMENT RESULTS

Freq. (MHz)	Channel	Mode	RF Output Power (EIRP)	Battery Type	Antenna Position	Phantom Section	Test Position	SAR (w/kg)
1902.0	25	TDMA	16.1 mW	Standard	Retracted	Left Ear	Cheek/Touch	0.0329
1902.0	25	TDMA	16.1 mW	Standard	Extended	Left Ear	Cheek/Touch	0.0264
1902.0	25	TDMA	16.1 mW	Standard	Retracted	Left Ear	Ear/Tilt	0.0522
1902.0	25	TDMA	16.1 mW	Standard	Extended	Left Ear	Ear/Tilt	0.0674
1902.0	25	TDMA	16.1 mW	Standard	Retracted	Right Ear	Cheek/Touch	0.0297
1902.0	25	TDMA	16.1 mW	Standard	Extended	Right Ear	Cheek/Touch	0.0257
1902.0	25	TDMA	16.1 mW	Standard	Retracted	Right Ear	Ear/Tilt	0.0624
1902.0	25	TDMA	16.1 mW	Standard	Extended	Right Ear	Ear/Tilt	0.0859
Mixture Type: BRAIN Dielectric Constant: 40.0 Conductivity: 1.36 (Measured)			**ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak - Uncontrolled Exposure / General Population BRAIN: 1.6 W/kg (averaged over 1 gram)**					

Notes:

1. The SAR values found for mid channel in each test configuration were 2.0dB or greater below the SAR limit of 1.6 w/kg, therefore only the mid channel data is reported.
2. The highest head SAR value found was 0.0884 w/kg (right ear, ear/tilt position, antenna extended).
3. The EUT was tested using the standard battery, which is the only battery option for this phone.
4. Ambient TEMPERATURE: 22.5 °C
   Relative HUMIDITY: 56.2 %
   Atmospheric PRESSURE: 95.6 kPa
5. Fluid Temperature ≈ 23 °C
6. During the entire test the conducted power was maintained to within 5% of the initial conducted power.

MEASUREMENT SUMMARY (CONT.)

BODY SAR MEASUREMENT RESULTS

Freq. (MHz)	Chan.	Mode	RF Output Power (EIRP)	Phantom Section	Battery Type	Separation Distance (cm)	Antenna Position	SAR (w/kg)
1902.0	25	TDMA	16.1 mW	Planar	Standard	0.0	Retracted	0.153
1902.0	25	TDMA	16.1 mW	Planar	Standard	0.0	Extended	0.332
Mixture Type: Body Dielectric Constant: 53.3 Conductivity: 1.52 (Measured)			**ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak - Uncontrolled Exposure / General Population BODY: 1.6 W/kg (averaged over 1 gram)**					

Notes:

1. The SAR values found for mid channel were 2.0dB or greater below the SAR limit of 1.6 w/kg, therefore only the mid channel data is reported.
2. The highest body SAR value found was 0.332 w/kg.
3. The EUT was tested using the standard battery, which is the only battery option for this phone.
4. The EUT was tested for body SAR with the back of the EUT touching the outer surface of the SAM planar phantom.
5. Ambient TEMPERATURE: 22.5 °C
   Relative HUMIDITY: 56.2 %
   Atmospheric PRESSURE: 95.6 kPa
6. Fluid Temperature ≈ 23 °C
7. During the entire test the conducted power was maintained to within 5% of the initial conducted power.

5.0 DETAILS OF SAR EVALUATION

The UTSTARCOM INC. Model: UTS-708SY Single-Mode PCS TDMA Phone FCC ID: O6YUTS-708SY was found to be compliant for localized Specific Absorption Rate (SAR) based on the following test provisions and conditions:

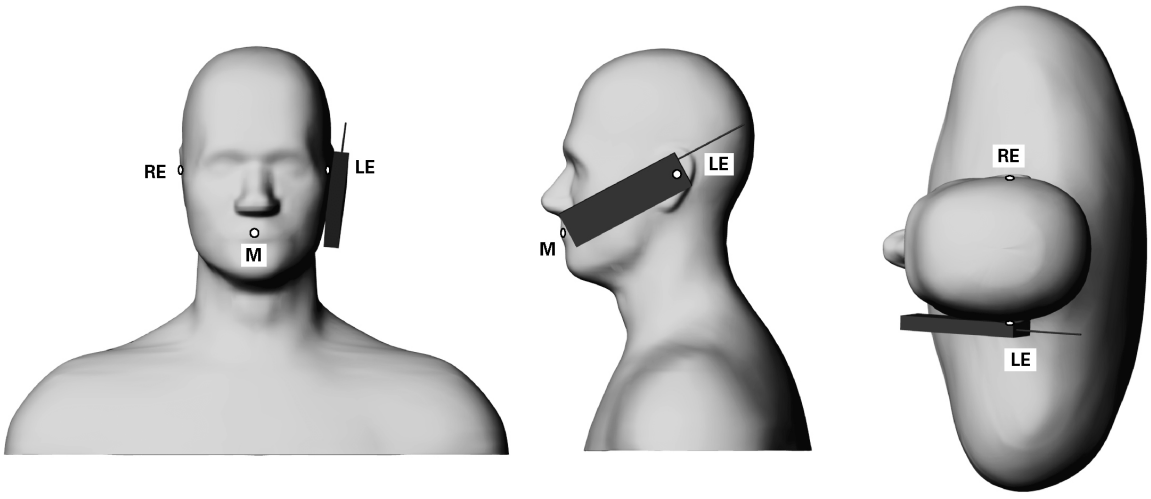
1) The EUT was tested in a ear-held configuration on both the left and right sections of the phantom with the device antenna in both the extended and retracted positions as follows:

   a) The handset was placed in the device holder in a normal operating position with the test device reference point located along the vertical centerline on the front of the device aligned to the ear reference point, with the center of the earpiece touching the center of the ear spacer of the SAM phantom.

   b) With the handset positioned parallel to the cheek, the test device reference point was aligned to the ear reference point on the head phantom, and the vertical centerline was aligned to the phantom reference plane (initial ear position).

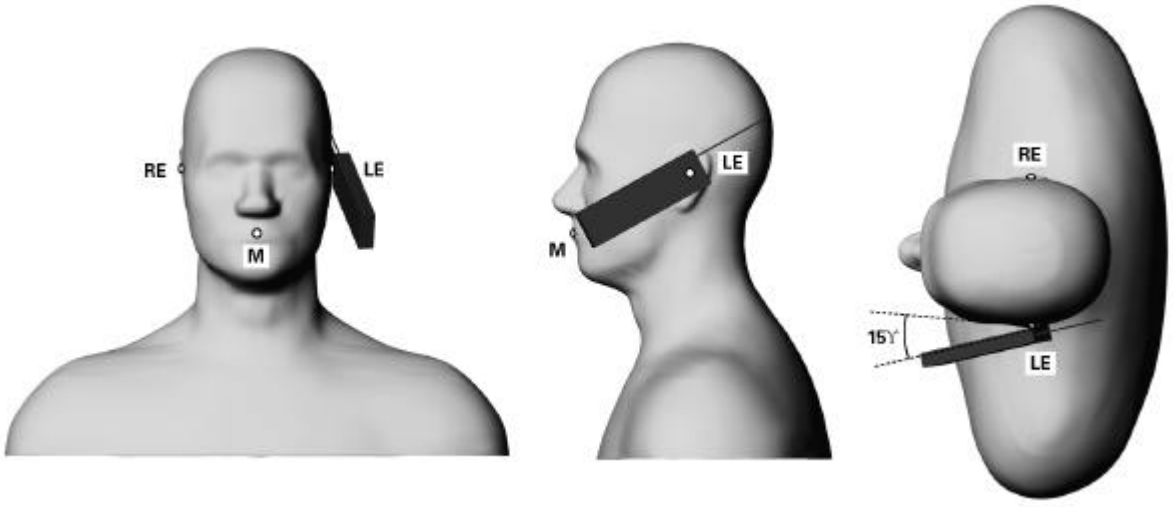
   c) While maintaining the three alignments, the body of the handset was gradually adjusted to each of the following test positions:

   • Cheek/Touch Position: The handset was brought toward the mouth of the head phantom by pivoting against the ear reference point until any point of the mouthpiece or keypad touched the phantom.



Phone position 1, "cheek" or "touch" position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated (Shoulders are shown for illustration only).

- Ear/Tilt Position: With the phone aligned in the Cheek/Touch position, the handset was tilted away from the mouth with respect to the test device reference point by 15 degrees.



Phone position 2, "tilted position." The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated (Shoulders are shown for illustration only).

2) The EUT was tested in a body-worn configuration with the back of the phone placed parallel to**,** and touching, the outer surface of the SAM planar phantom, and with the device antenna in both extended and retracted modes.
3) SAR measurements were evaluated at the maximum conducted power level set by the manufacturer.
4) The EUT was operated for an appropriate period prior to the evaluation in order to minimize drift. If the EUT had any appreciable drift over the course of the evaluation, then the EUT was re-evaluated. Any unusual anomalies over the course of the test also warranted a re-evaluation.
5) The EUT was placed into test mode via keypad access at a full data rate in the "always up" power control mode.
6) The location of the maximum spatial SAR distribution (Hot Spot) was determined relative to the handset and its antenna.
7) The EUT was tested with a fully charged battery.

6.0 EVALUATION PROCEDURES

The Specific Absorption Rate (SAR) evaluation was performed in the following manner:

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 at the low, middle, and high frequencies of the band at maximum power, and with the device antenna in both the extended and extracted positions as applicable. The positioning of the ear-held device relative to the phantom was performed in accordance with FCC OET Bulletin 65, Supplement C (Edition 01-01) using the SAM phantom.

(ii) For face-held and body-worn devices a planar phantom was used.

b. The SAR was determined by a pre-defined procedure within the DASY3 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface using a uniform grid spacing.

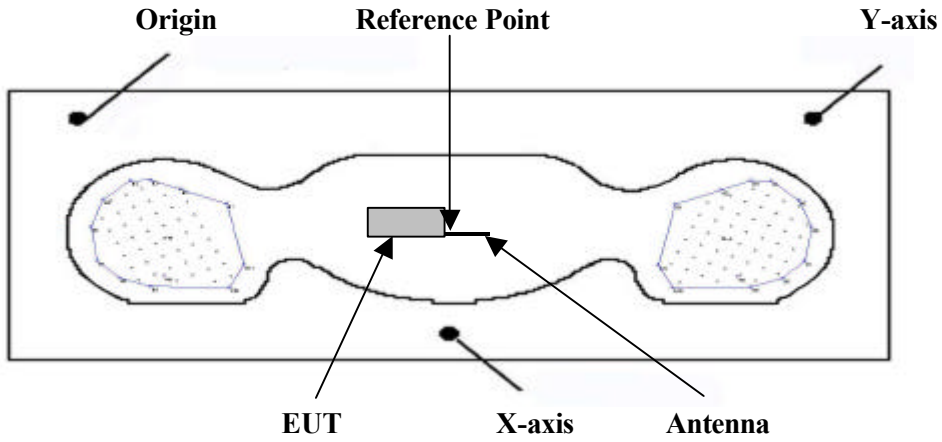
c. A 5x5x7 matrix was performed around the greatest spatial SAR distribution found during the area scan of the applicable exposed region. SAR values were then calculated using a 3-D spline interpolation algorithm and averaged over spatial volumes of 1 and 10 grams.

d. The depth of the simulating tissue in the phantom used for the SAR evaluation was no less than 15cm.

e. The target tissue parameters for 1800MHz were used in the SAR evaluation software. If there was any appreciable variation in the measured tissue parameters from the target values specified then the SAR was adjusted using the sensitivities to SAR (see "Appendix D-SAR Sensitivities").

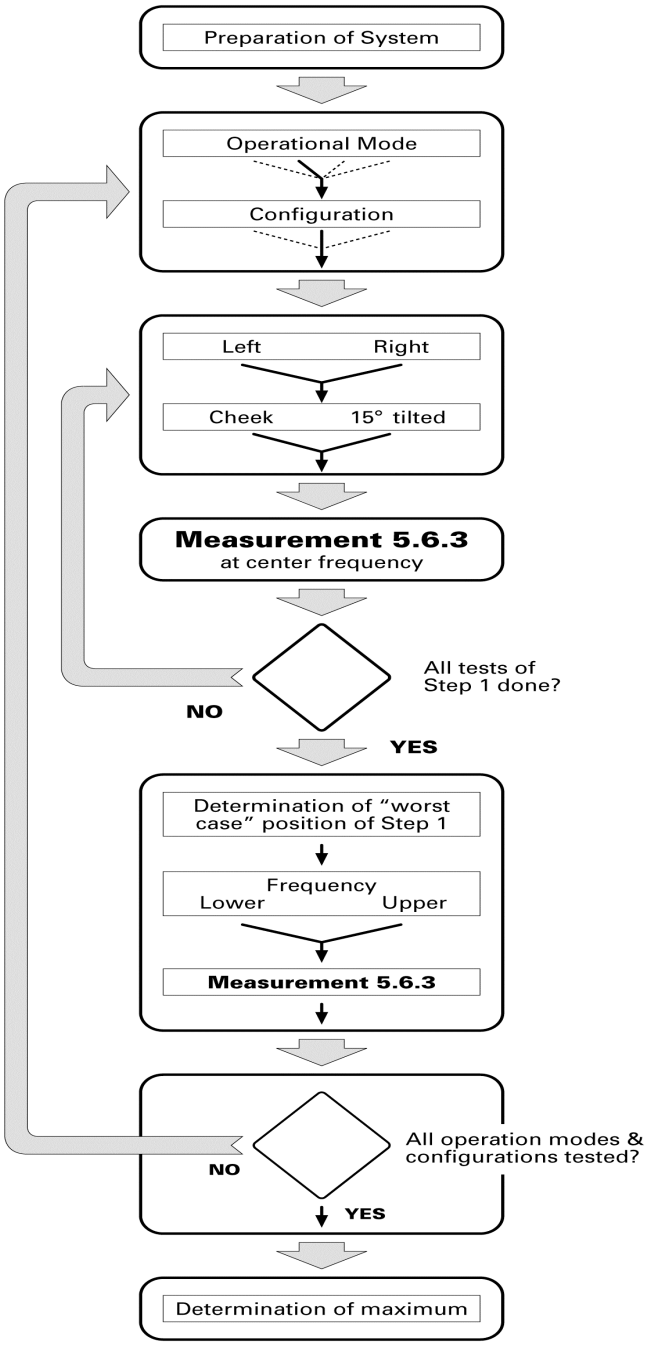
f. The E-field probe conversion factors for 1800MHz body were determined as follows:

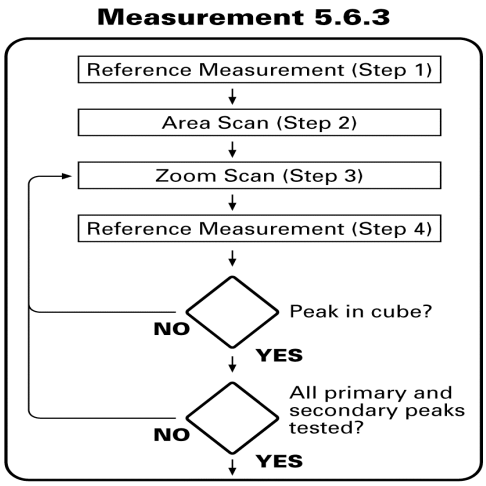
- In brain and body tissue between 1.6GHz and 2GHz, the conversion factor decreases approximately 1% per 100MHz frequency increase.
- The conversion factor in body tissue is approximately 3% lower than for brain tissue for the same frequency.



Device Positioning & Reference Point (Body SAR)

EVALUATION PROCEDURES (Cont.)





7.0 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

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. 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.

8.0 SYSTEM VALIDATION

Prior to the assessment, the system was verified in the planar section of the SAM phantom using an 1800MHz dipole. A forward power of 250mW was applied to the dipole, and the system was verified to a tolerance of ±10%. The applicable verification is as follows (see Appendix B for validation test plot):

Dipole Validation Kit	Target SAR 1g (w/kg)	Measured SAR 1g (w/kg)	Fluid Temperature	Ambient Temperature	Validation Date
D1800V2	9.66	9.40	≈23.0 °C	22.5 °C	09/17/01

9.0 SIMULATED TISSUES

The 1800MHz brain and body mixtures consist of Glycol-monobutyl, water, and salt. The fluid was prepared according to standardized procedures, and measured for dielectric parameters (permitivity and conductivity).

TISSUE MIXTURE - DIPOLE VALIDATION & EUT EVALUATION		
INGREDIENT	**1800MHz Brain Mixture (Validation & EUT Evaluation)**	**1800MHz Body Mixture (EUT Evaluation)**
Water	54.90 %	69.91
Glycol Monobutyl	44.92 %	29.96
Salt	0.18 %	0.13

10.0 TISSUE PARAMETERS

The dielectric parameters of the fluids were verified prior to the SAR evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer. The dielectric parameters of the fluid are as follows:

TISSUE PARAMETERS - DIPOLE VALIDATION & EUT EVALUATION			
Equivalent Tissue	**Dielectric Constant e_r**	**Conductivity s (mho/m)**	**r (Kg/m^3)**
1800MHz Brain (Target)	40.0 ±5%	1.36 ±5%	1000
1800MHz Brain (Measured: 09/17/01)	40.0	1.36	1000
1800MHz Body (Target)	53.3 ±5%	1.52 ±5%	1000
1800MHz Body (Measured: 09/17/01)	53.3	1.52	1000

11.0 ROBOT SYSTEM SPECIFICATIONS

Specifications

POSITIONER:	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability:	0.02 mm
No. of axis:	6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor:	Pentium III
Clock Speed:	450 MHz
Operating System:	Windows NT
Data Card:	DASY3 PC-Board

Data Converter

Features:	Signal Amplifier, multiplexer, A/D converter, and control logic
Software:	DASY3 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

E-Field Probe

Model:	ET3DV6
Serial No.:	1590
Construction:	Triangular core fiber optic detection system
Frequency:	10 MHz to 6 GHz
Linearity:	± 0.2 dB (30 MHz to 3 GHz)

Phantom

Type:	SAM V4.0C
Configuration:	Left Head, Right Head, Planar Section
Shell Material:	Fiberglass
Thickness:	2.0 ± 0.1 mm
Volume:	Approx. 20 liters

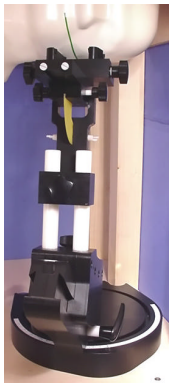
12.0 SAM PHANTOM V4.0C

The SAM phantom V4.0C is a fiberglass shell phantom with a 2.0 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.

SAM Phantom V4.0C

13.0 DEVICE HOLDER

The DASY3 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

14.0 PROBE SPECIFICATION (ET3DV6)

Construction:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. 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 ± 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)
Dynam. Rnge:	5 µW/g to >100 mW/g; Linearity: ±0.2 dB
Srfce. 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

15.0 TEST EQUIPMENT LIST

SAR MEASUREMENT SYSTEM		
EQUIPMENT	***SERIAL NO.***	***CALIBRATION DATE***
DASY3 System -Robot -ET3DV6 E-Field Probe -DAE -900MHz Validation Dipole -1800MHz Validation Dipole -SAM Phantom V4.0C	 599396-01 1590 383 054 247 N/A	 N/A Mar 2001 Sept 1999 June 2001 June 2001 N/A
85070C Dielectric Probe Kit	N/A	N/A
Gigatronics 8652A Power Meter -Power Sensor 80701A -Power Sensor 80701A	1835272 1833535 1833542	Oct 1999 May 2001 Feb 2001
E4408B Spectrum Analyzer	US39240170	Nov 1999
8594E Spectrum Analyzer	3543A02721	Mar 2000
8753E Network Analyzer	US38433013	Nov 1999
8648D Signal Generator	3847A00611	N/A
5S1G4 Amplifier Research Power Amplifier	26235	N/A

16.0 MEASUREMENT UNCERTAINTIES

Uncertainty Description	Error	Distribution	Weight	Standard Deviation	Offset
Probe Uncertainty					
Axial isotropy	±0.2 dB	U-Shaped	0.5	±2.4 %	
Spherical isotropy	±0.4 dB	U-Shaped	0.5	±4.8 %	
Isotropy from gradient	±0.5 dB	U-Shaped	0	±	
Spatial resolution	±0.5 %	Normal	1	±0.5 %	
Linearity error	±0.2 dB	Rectangle	1	±2.7 %	
Calibration error	±3.3 %	Normal	1	±3.3 %	
SAR Evaluation Uncertainty					
Data acquisition error	±1 %	Rectangle	1	±0.6 %	
ELF and RF disturbances	±0.25 %	Normal	1	±0.25 %	
Conductivity assessment	±5 %	Rectangle	1	±5.8 %	
Spatial Peak SAR Evaluation Uncertainty					
Extrapolated boundary effect	±3 %	Normal	1	±3 %	±5 %
Probe positioning error	±0.1 mm	Normal	1	±1 %	
Integrated and cube orientation	±3 %	Normal	1	±3 %	
Cube Shape inaccuracies	±2 %	Rectangle	1	±1.2 %	
Device positioning	±6 %	Normal	1	±6 %	
Combined Uncertainties				±11.7 %	±5 %

Measurement uncertainties in SAR measurements are difficult to quantify due to several variables including biological, physiological, and environmental.

According to ANSI/IEEE C95.3, the overall uncertainties are difficult to assess and will vary with the type of meter and usage situation. However, accuracy's of ± 1 to 3 dB can be expected in practice, with greater uncertainties in near-field situations and at higher frequencies (shorter wavelengths), or areas where large reflecting objects are present. Under optimum measurement conditions, SAR measurement uncertainties of at least ± 2dB can be expected.

According to CENELEC, typical worst-case uncertainty of field measurements is ± 5 dB.
For well-defined modulation characteristics the uncertainty can be reduced to ± 3 dB.

17.0 REFERENCES

(1) ANSI, *ANSI/IEEE C95.1: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 Ghz, The Institute of Electrical and Electronics Engineers, Inc., New York, NY: 1992.*

(2) 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. 20554: June 2001.

(3) Thomas Schmid, Oliver Egger, and Neils Kuster, "Automated E-field scanning system for dosimetric assessments", IEEE *Transaction on Microwave Theory and Techniques,* Vol. 44, pp. 105 – 113: January 1996.

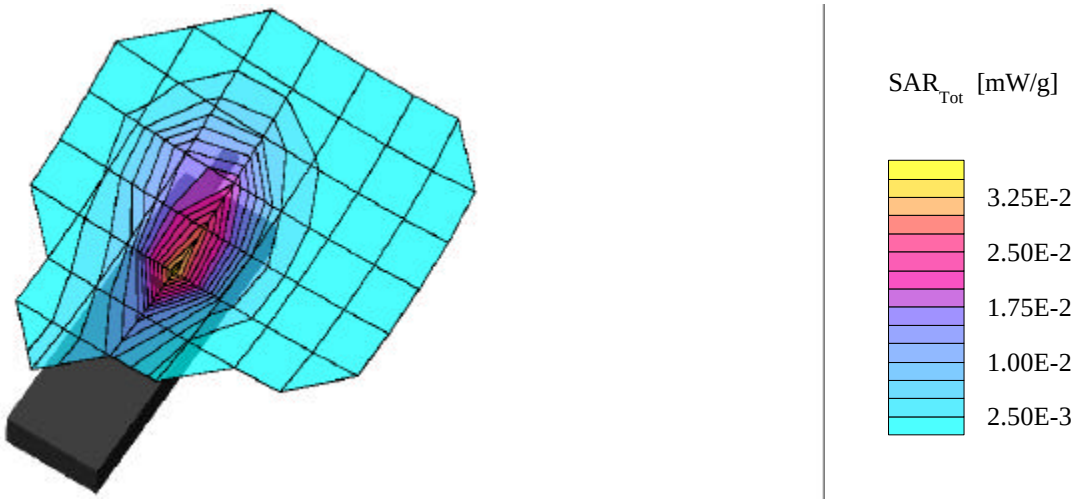
(4) Niels Kuster, Ralph Kastle, and Thomas Schmid, "Dosimetric evaluation of mobile communications equipment with know precision", IEICE Transactions of Communications, vol. E80-B, no. 5, pp. 645 – 652: May 1997.

APPENDIX A - SAR MEASUREMENT DATA

UTStarcom Inc. FCC ID: O6YUTS-708SY

Generic Twin Phantom; Left Hand Section; Position: (75°,65°)
Probe: ET3DV6 - SN1590; ConvF(5.78,5.78,5.78); Crest factor: 8.0
1800 MHz Brain: σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.04 dB
SAR (1g): 0.0329 mW/g, SAR (10g): 0.0175 mW/g

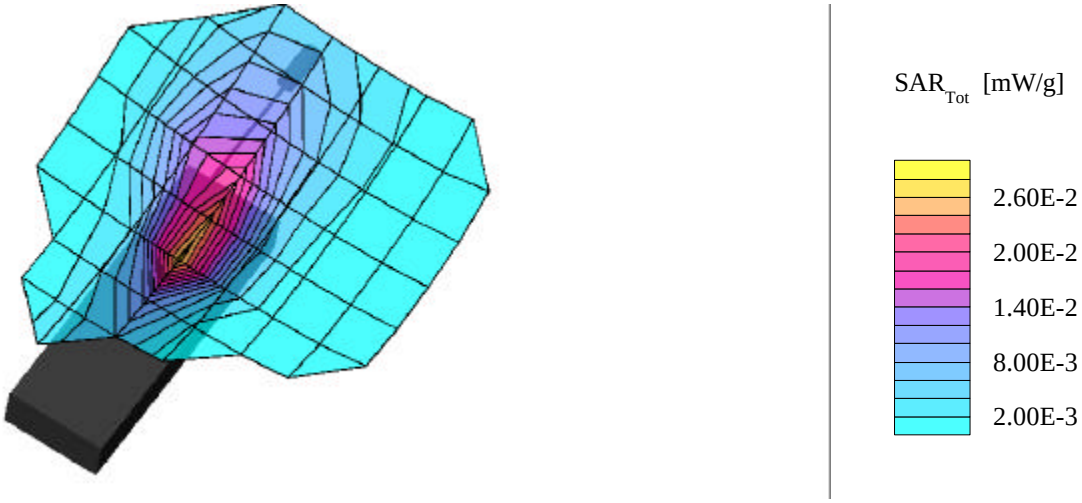
Left Head - Cheek/Touch Position
Antenna In
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001



UTStarcom Inc. FCC ID: O6YUTS-708SY

Generic Twin Phantom; Left Hand Section; Position: (75°,65°)
Probe: ET3DV6 - SN1590; ConvF(5.78,5.78,5.78); Crest factor: 8.0
1800 MHz Brain: σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: 0.01 dB
SAR (1g): 0.0264 mW/g, SAR (10g): 0.0141 mW/g

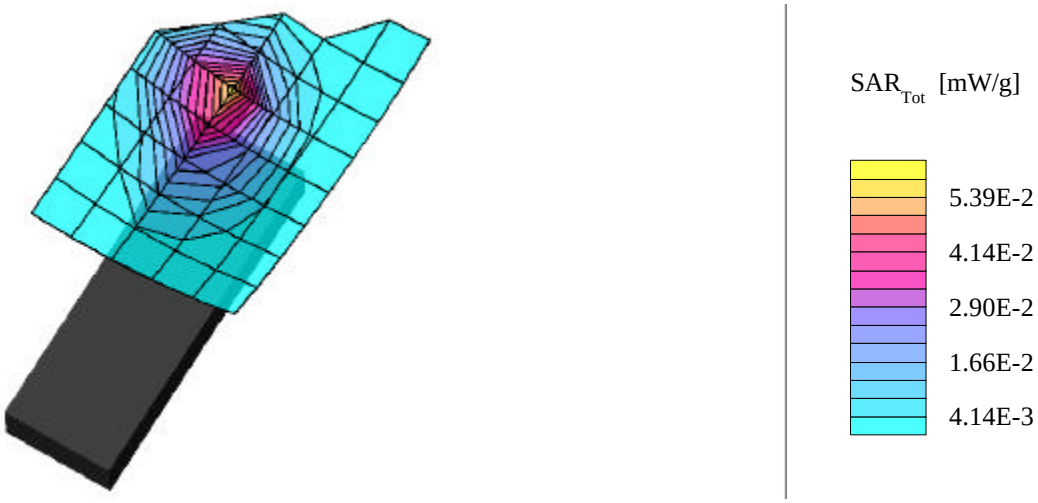
Left Head - Cheek/Touch Position
Antenna Out
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001



UTStarcom Inc. FCC ID: O6YUTS-708SY

SAM Phantom; Left Hand Section; Position: (105°,65°)
Probe: ET3DV6 - SN1590; ConvF(5.78,5.78,5.78); Crest factor: 8.0
1800 MHz Brain: σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.02 dB
SAR (1g): 0.0522 mW/g, SAR (10g): 0.0261 mW/g

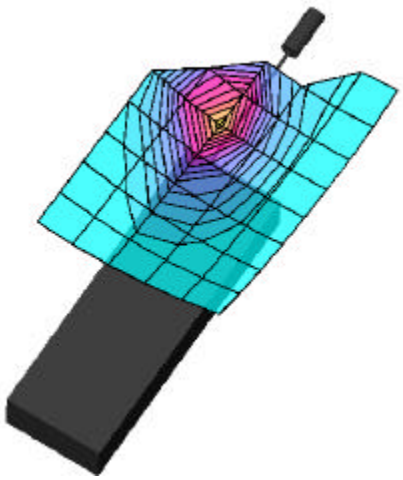
Left Head - Ear/Tilt Position
Antenna In
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001

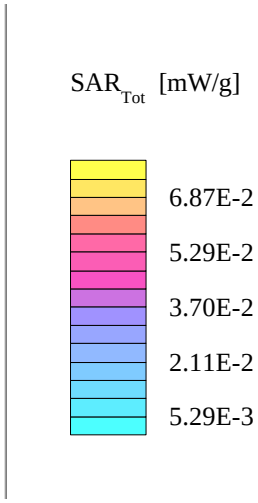


UTStarcom Inc. FCC ID: O6YUTS-708SY

SAM Phantom; Left Hand Section; Position: (105°,65°)
Probe: ET3DV6 - SN1590; ConvF(5.78,5.78,5.78); Crest factor: 8.0
1800 MHz Brain: σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.03 dB
SAR (1g): 0.0674 mW/g, SAR (10g): 0.0365 mW/g

Left Head - Ear/Tilt Position
Antenna Out
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001

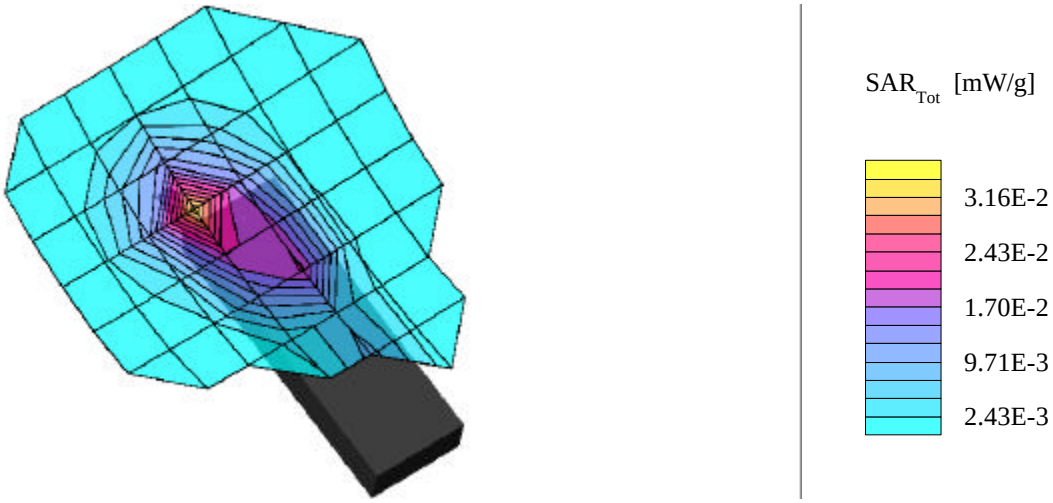




UTStarcom Inc. FCC ID - O6YUTS-708SY

Generic Twin Phantom; Right Hand Section; Position: (75°,65°)
Probe: ET3DV6 - SN1590; ConvF(5.78,5.78,5.78); Crest factor: 3.0
1800 MHz Brain: σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: 0.01 dB
SAR (1g): 0.0297 mW/g, SAR (10g): 0.0159 mW/g

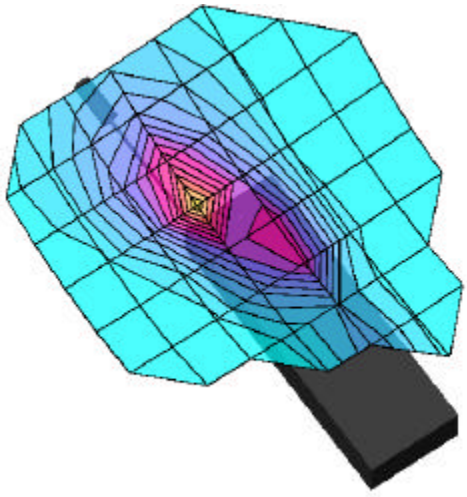
Right Head - Cheek/Touch Position
Antenna In
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001

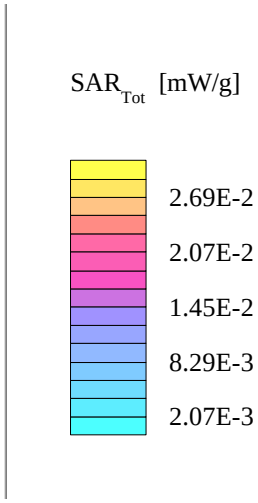


UTStarcom Inc. FCC ID: O6YUTS-708SY

Generic Twin Phantom; Right Hand Section; Position: (75°,65°)
Probe: ET3DV6 - SN1590; ConvF(5.78,5.78,5.78); Crest factor: 8.0
1800 MHz Brain: σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: 0.05 dB
SAR (1g): 0.0257 mW/g, SAR (10g): 0.0141 mW/g

Right Head - Cheek/Touch Position
Antenna Out
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001

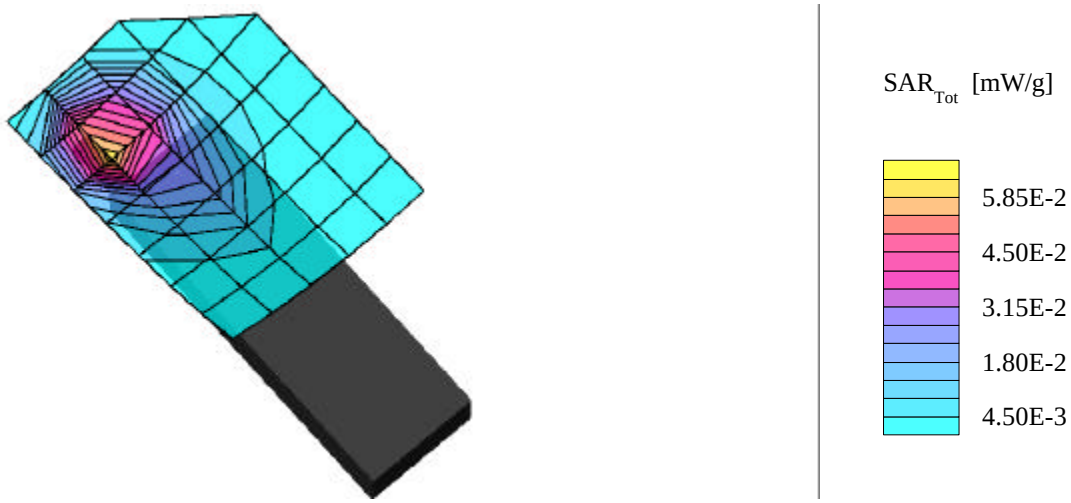




UTStarcom Inc. FCC ID: O6YUTS-708SY

SAM Phantom; Righ Hand Section; Position: (105°,295°)
Probe: ET3DV6 - SN1590; ConvF(5.78,5.78,5.78); Crest factor: 8.0
1800 MHz Brain: σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.05 dB
SAR (1g): 0.0624 mW/g, SAR (10g): 0.0315 mW/g

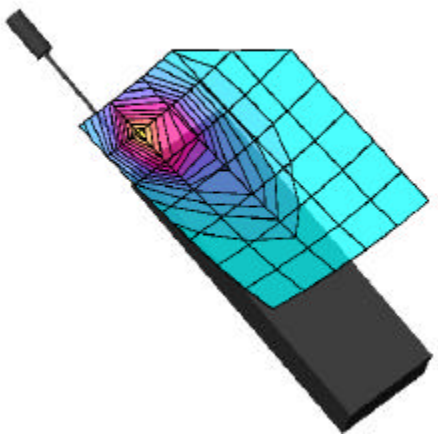
Right Head - Ear/Tilt Position
Antenna In
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001

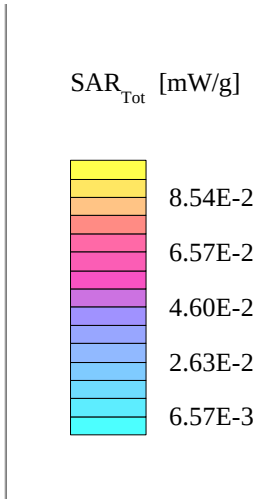


UTStarcom Inc. FCC ID: O6YUTS-708SY

SAM Phantom; Righ Hand Section; Position: (105°,295°)
Probe: ET3DV6 - SN1590; ConvF(5.78,5.78,5.78); Crest factor: 8.0
1800 MHz Brain: σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.01 dB
SAR (1g): 0.0859 mW/g, SAR (10g): 0.0457 mW/g

Right Head - Ear/Tilt Position
Antenna Out
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001



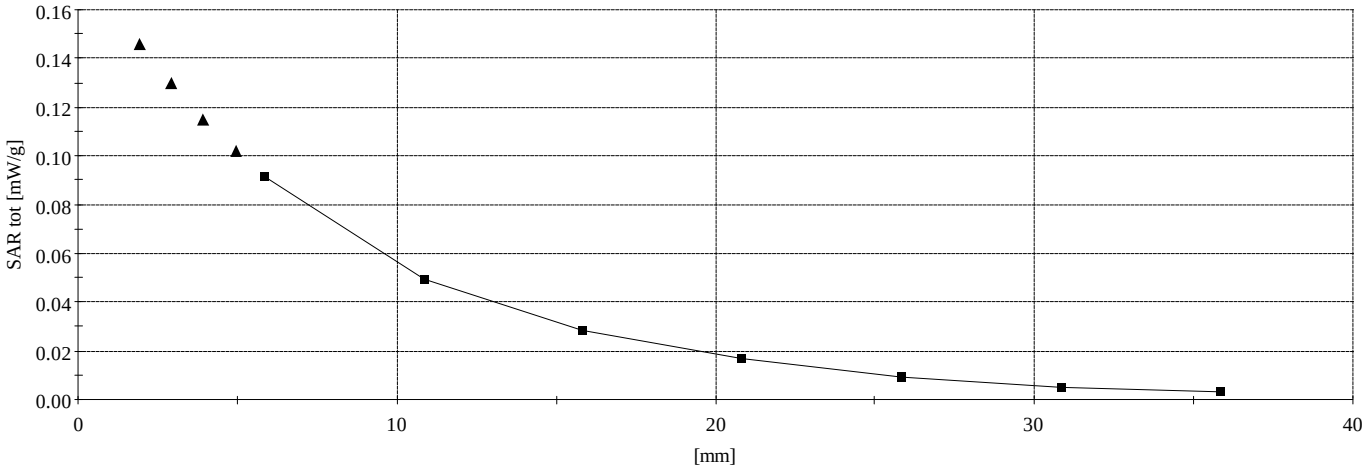


UTStarcom Inc. FCC ID: O6YUTS-708SY

SAM Phantom; Right Hand Section
Probe: ET3DV6 - SN1590; ConvF(5.78,5.78,5.78); Crest factor: 8.0;
1800 MHz Brain: σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Cube 5x5x7

Z-Axis Extrapolation at Peak SAR Location

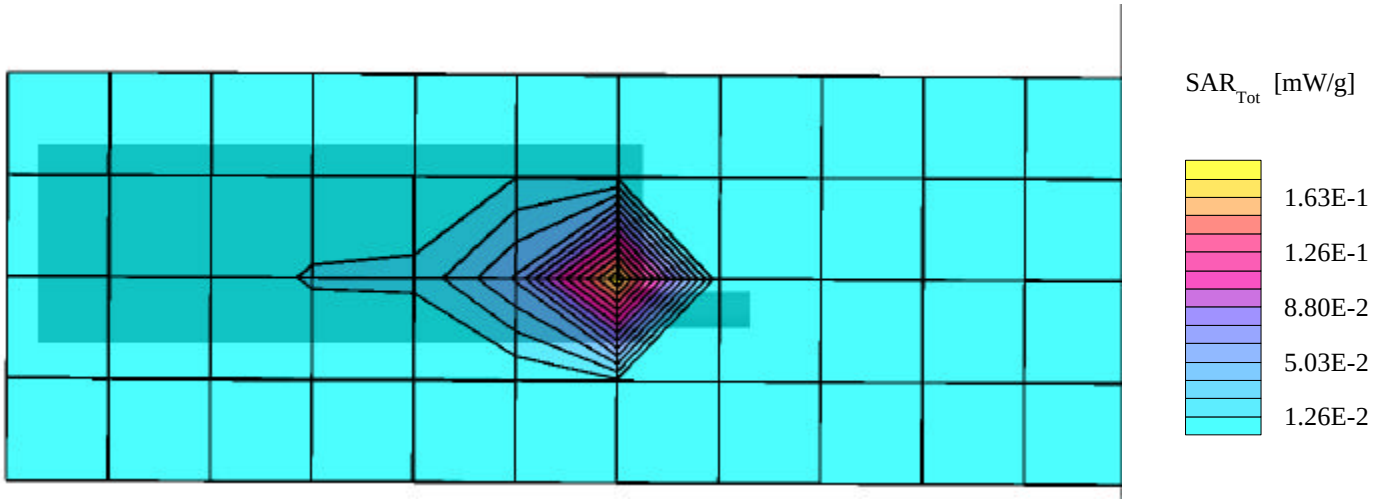
Right Head - Ear/Tilt Position
Antenna Out
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001



UTStarcom Inc. FCC ID: O6YUTS-708SY

SAM Phantom; Flat Section; Position: (270°,215°)
Probe: ET3DV6 - SN1590; ConvF(5.36,5.36,5.36); Crest factor: 8.0
1800MHz Muscle: σ = 1.52 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: 0.03 dB
SAR (1g): 0.153 mW/g, SAR (10g): 0.0663 mW/g

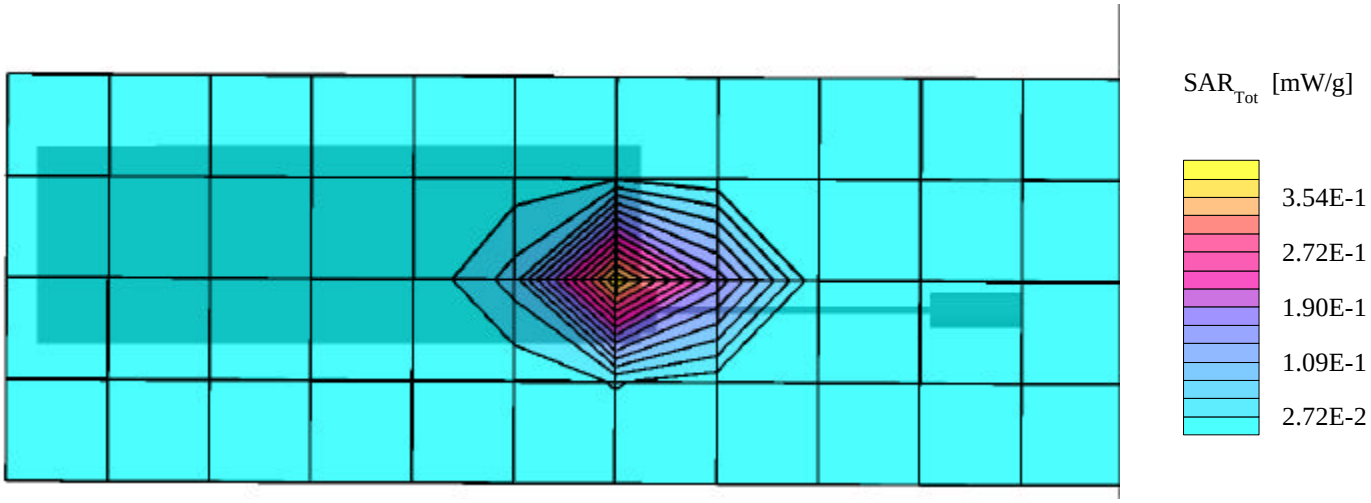
Body-Worn SAR at 0.0cm Separation Distance
Antenna In
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001



UTStarcom Inc. FCC ID: O6YUTS-708SY

SAM Phantom; Flat Section; Position: (270°,215°)
Probe: ET3DV6 - SN1590; ConvF(5.36,5.36,5.36); Crest factor: 8.0
1800MHz Muscle: σ = 1.52 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: 0.07 dB
SAR (1g): 0.332 mW/g, SAR (10g): 0.161 mW/g

Body-Worn SAR at 0.0cm Separation Distance
Antenna Out
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001

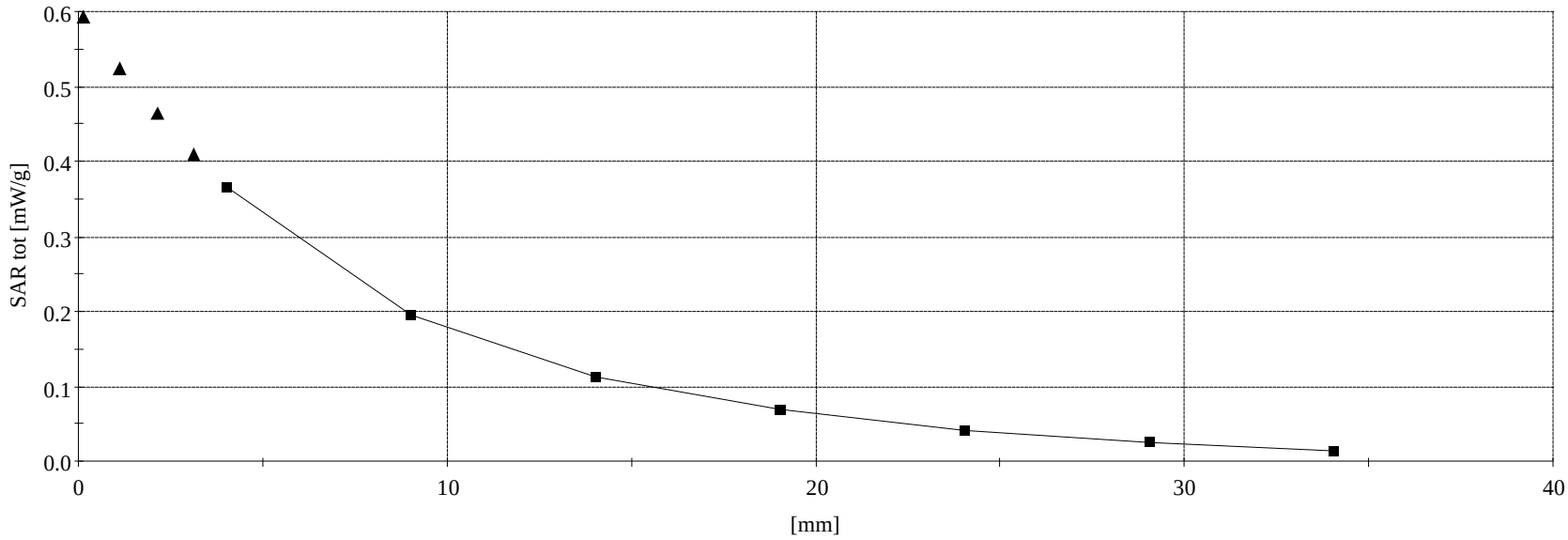


UTStarcom Inc. FCC ID: O6YUTS-708SY

SAM Phantom; Flat Section
Probe: ET3DV6 - SN1590; ConvF(5.36,5.36,5.36); Crest factor: 3.0;
1800MHz Muscle: σ = 1.52 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Cube 5x5x7

Z-Axis Extrapolation at Peak SAR Location

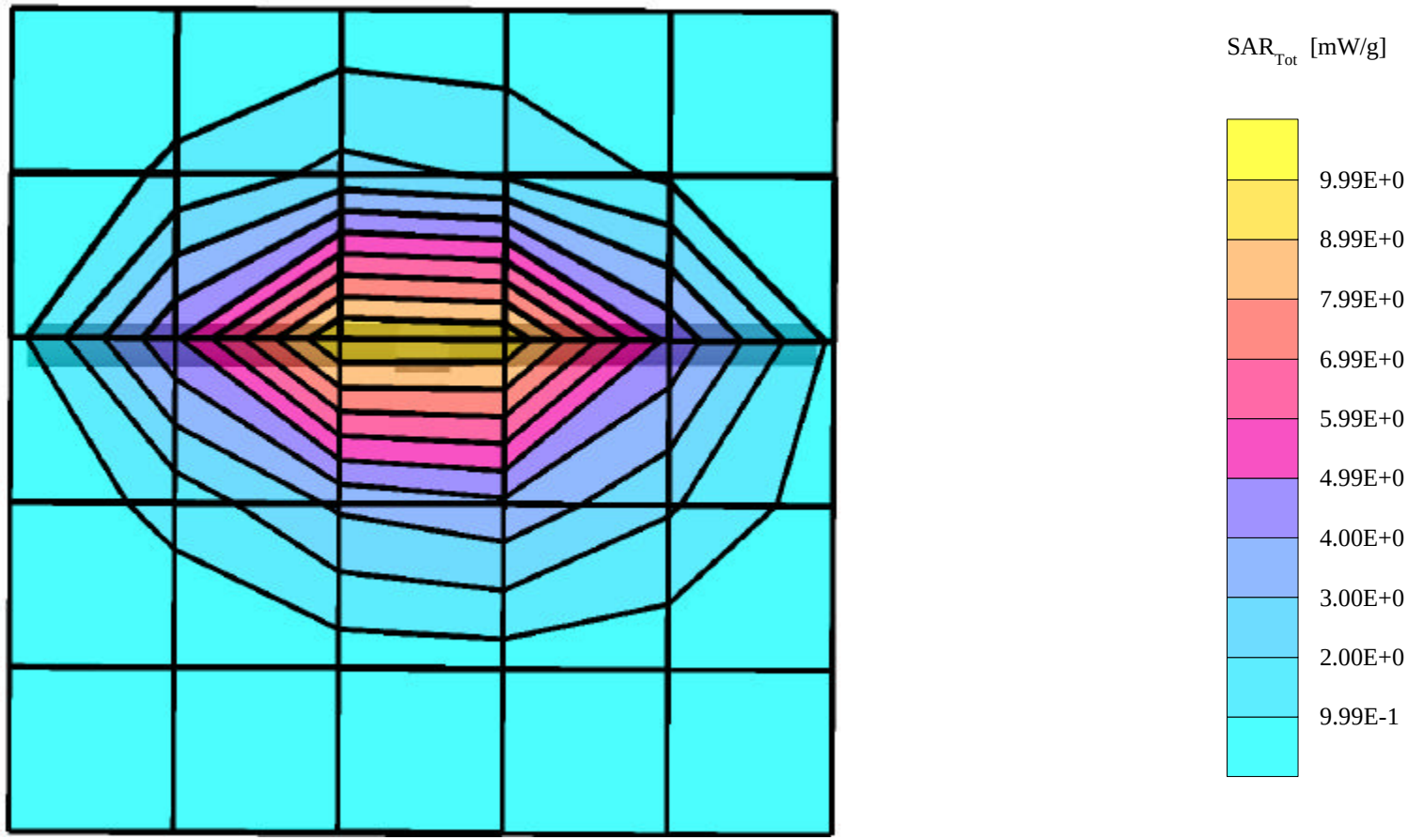
Body-Worn SAR at 0.0cm Separation Distance
Antenna Out
PCS Phone Model: UTS-708SY
Mode: TDMA
Channel 25 [1902.0 MHz]
Conducted Power: 10.0 mW
Date Tested: Sept. 17, 2001



APPENDIX B - DIPOLE VALIDATION

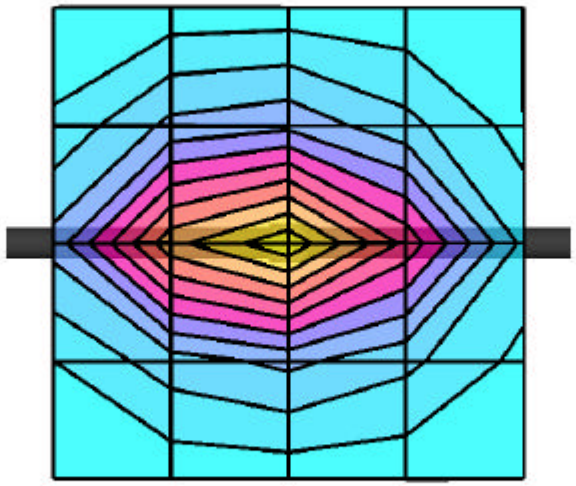
Dipole 1800 MHz

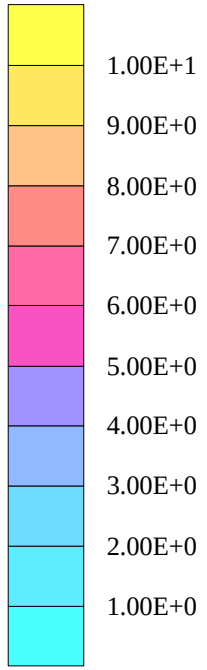
SAM Phantom; Flat Section - Validation Date: September 17, 2001
Probe: ET3DV6 - SN1590; ConvF(5.78,5.78,5.78); Crest factor: 1.0; 1800MHz Brain: σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 17.9 mW/g, SAR (1g): 9.40 mW/g, SAR (10g): 4.83 mW/g, (Worst-case extrapolation)
Penetration depth: 8.0 (7.5, 9.0) [mm]



Validation Dipole D1800V2 SN:247, d = 10 mm

Frequency: 1800 MHz; Antenna Input Power: 250 [mW]
Generic Twin Phantom; Flat Section; Grid Spacing:Dx = 15.0, Dy = 15.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(5.57,5.57,5.57); Crest factor: 1.0; IEEE1528 1800 MHz : σ = 1.36 mho/m ε_r = 40.0 ρ = 1.00 g/cm^3
Cubes (2): Peak: 18.2 mW/g ± 0.04 dB, SAR (1g): 9.66 mW/g ± 0.03 dB, SAR (10g): 5.02 mW/g ± 0.03 dB, (Worst-case extrapolation)
Penetration depth: 8.2 (7.6, 9.4) [mm]
Powerdrift: -0.01 dB





APPENDIX C - PROBE CALIBRATION

Probe ET3DV6

SN:1590

Manufactured:	March 19, 2001
Calibrated:	March 26, 2001

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1590

Sensitivity in Free Space

Diode Compression

NormX	**1.77**	$\mu V/(V/m)^2$	DCP X	**100**	mV
NormY	**1.91**	$\mu V/(V/m)^2$	DCP Y	**100**	mV
NormZ	**1.67**	$\mu V/(V/m)^2$	DCP Z	**100**	mV

Sensitivity in Tissue Simulating Liquid

Head **450 MHz** e_r **= 43.5 ± 5%** s **= 0.87 ± 10% mho/m**

ConvF X	**7.36**	extrapolated	Boundary effect:	
ConvF Y	**7.36**	extrapolated	Alpha	**0.29**
ConvF Z	**7.36**	extrapolated	Depth	**2.72**

Head **900 MHz** e_r **= 42 ± 5%** s **= 0.97 ± 10% mho/m**

ConvF X	**6.83**	± 7% (k=2)	Boundary effect:	
ConvF Y	**6.83**	± 7% (k=2)	Alpha	**0.37**
ConvF Z	**6.83**	± 7% (k=2)	Depth	**2.48**

Head **1500 MHz** e_r **= 40.4 ± 5%** s **= 1.23 ± 10% mho/m**

ConvF X	**6.13**	interpolated	Boundary effect:	
ConvF Y	**6.13**	interpolated	Alpha	**0.47**
ConvF Z	**6.13**	interpolated	Depth	**2.17**

Head **1800 MHz** e_r **= 40 ± 5%** s **= 1.40 ± 10% mho/m**

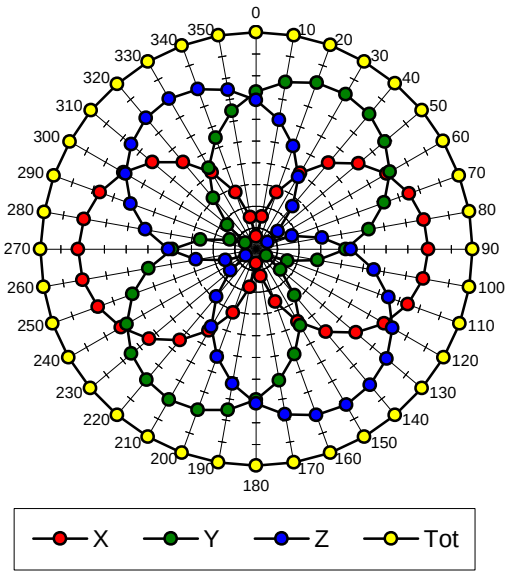
ConvF X	**5.78**	± 7% (k=2)	Boundary effect:	
ConvF Y	**5.78**	± 7% (k=2)	Alpha	**0.53**
ConvF Z	**5.78**	± 7% (k=2)	Depth	**2.01**

Sensor Offset

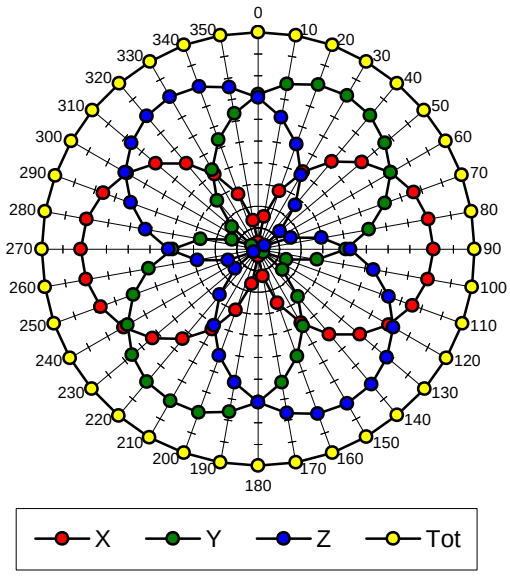
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.2 ± 0.2**	mm

Receiving Pattern (ϕ , θ = 0°

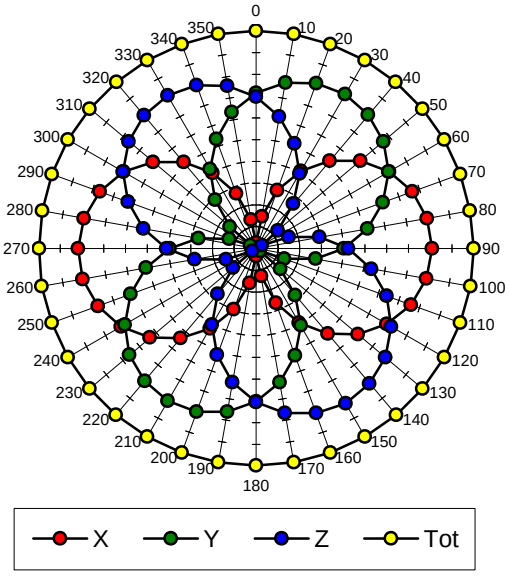
f = 30 MHz, TEM cell ifi110



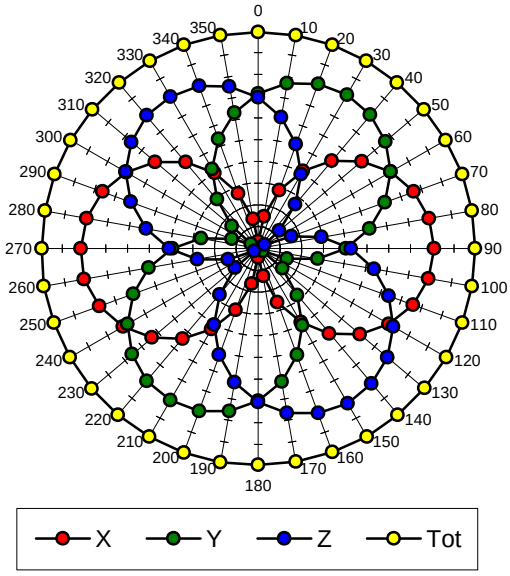
f = 100 MHz, TEM cell ifi110



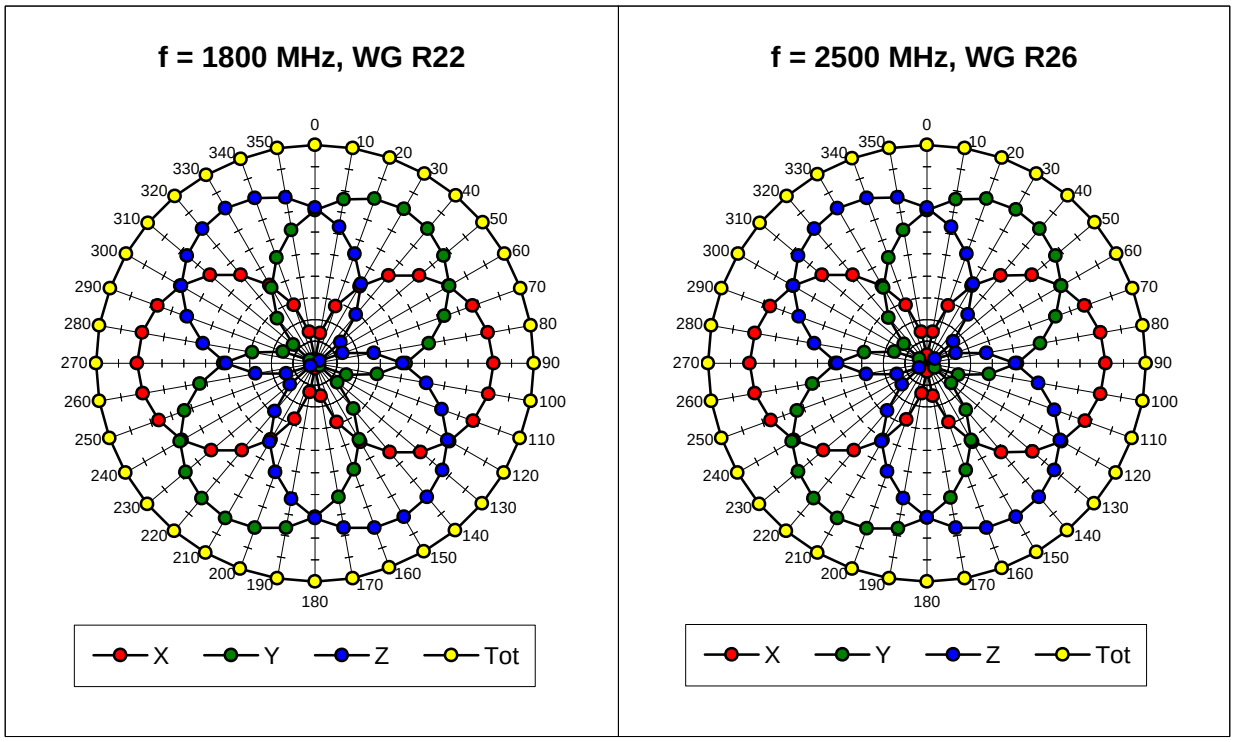
f = 300 MHz, TEM cell ifi110



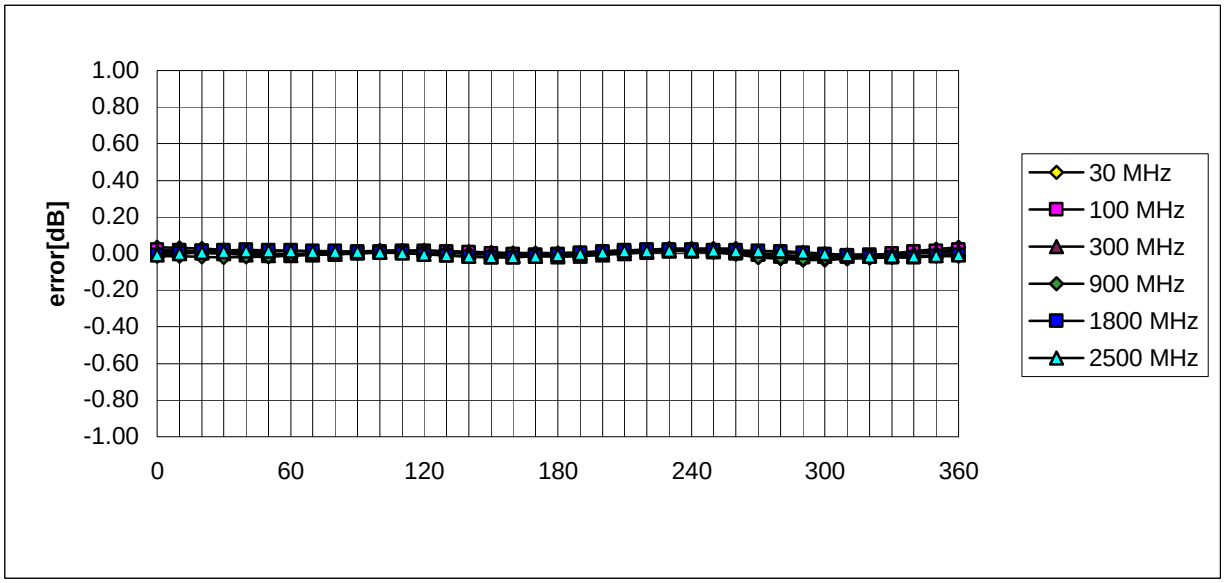
f = 900 MHz, TEM cell ifi110



ET3DV6 SN:1590

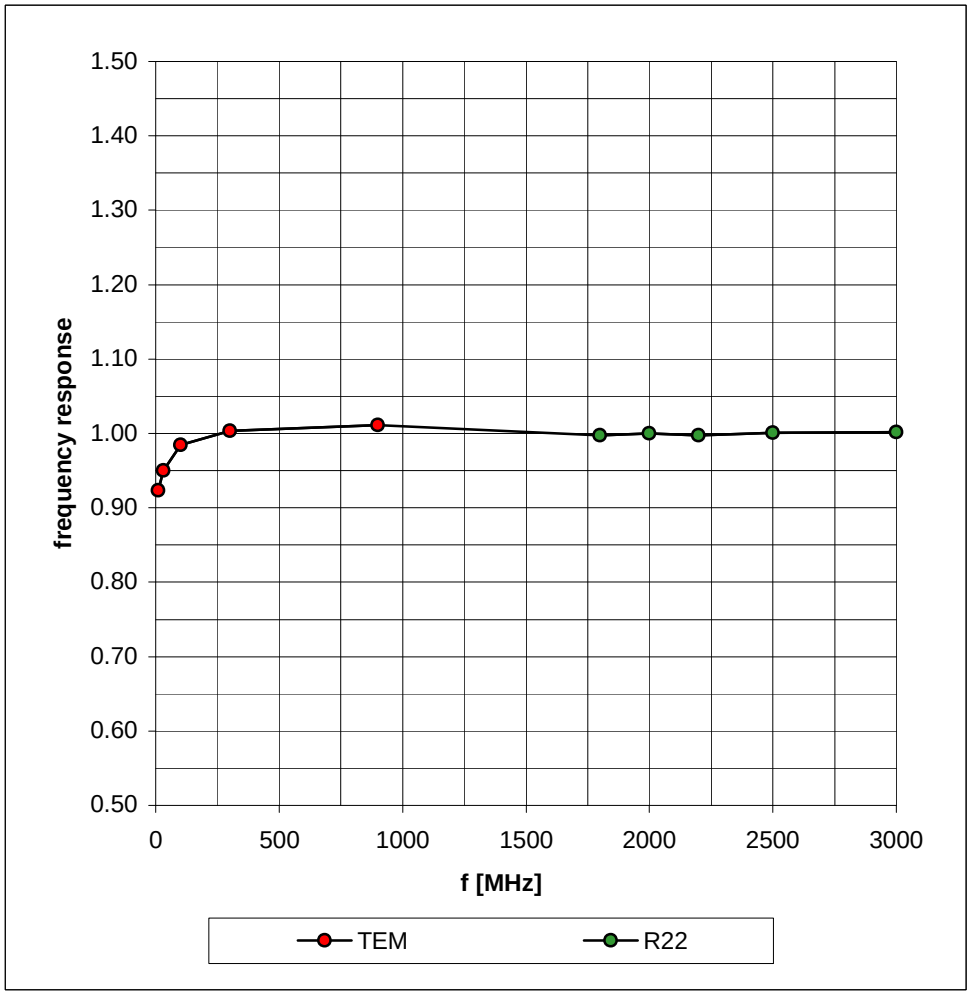


Isotropy Error (f), q = 0°



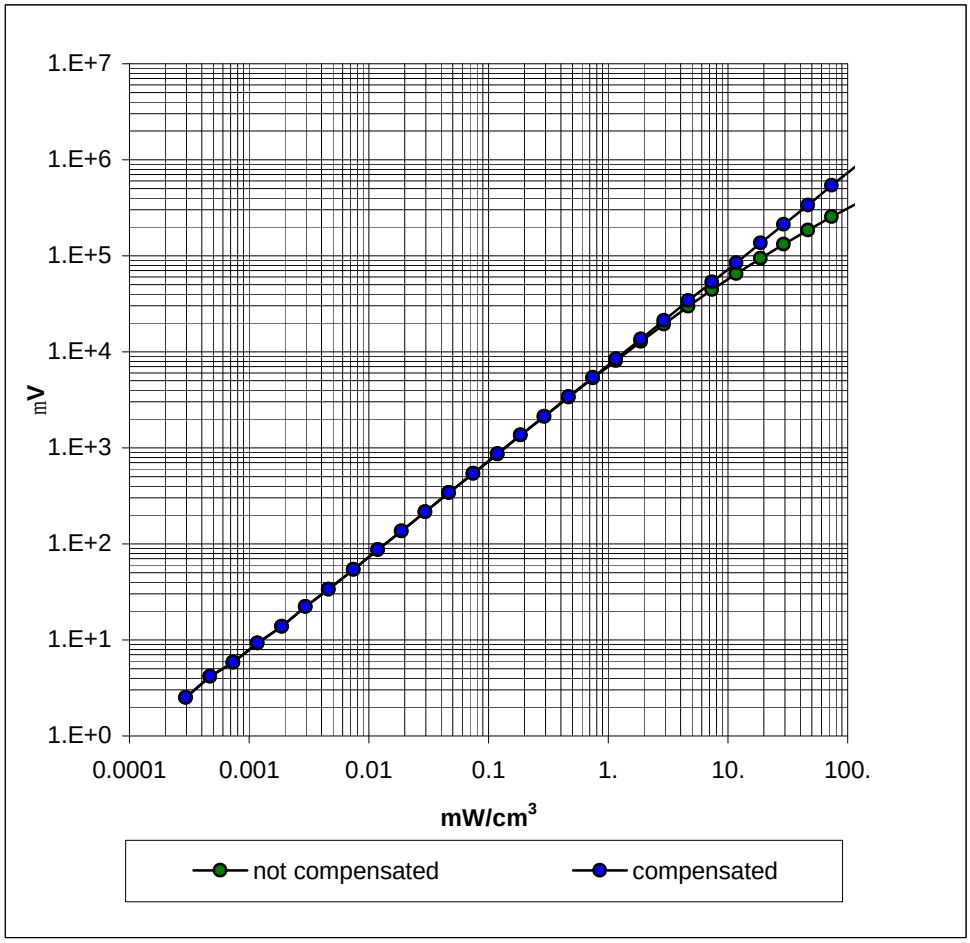
Frequency Response of E-Field

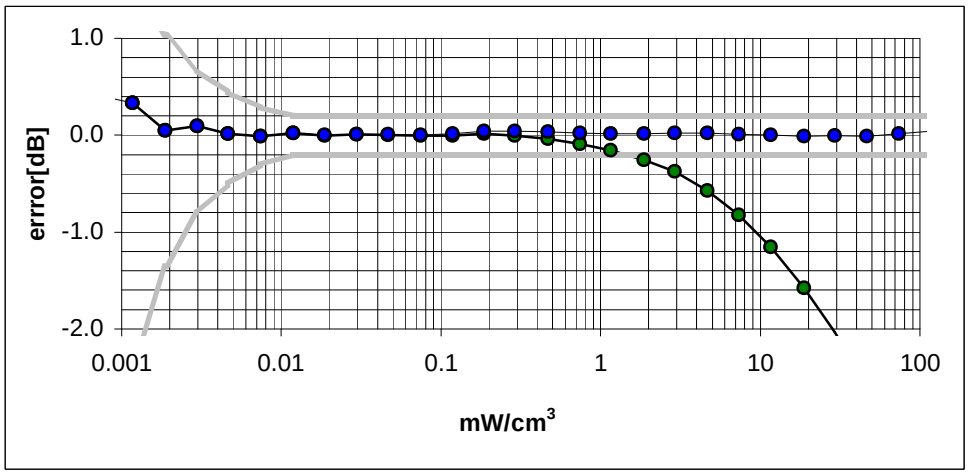
(TEM-Cell:ifi110, Waveguide R22)



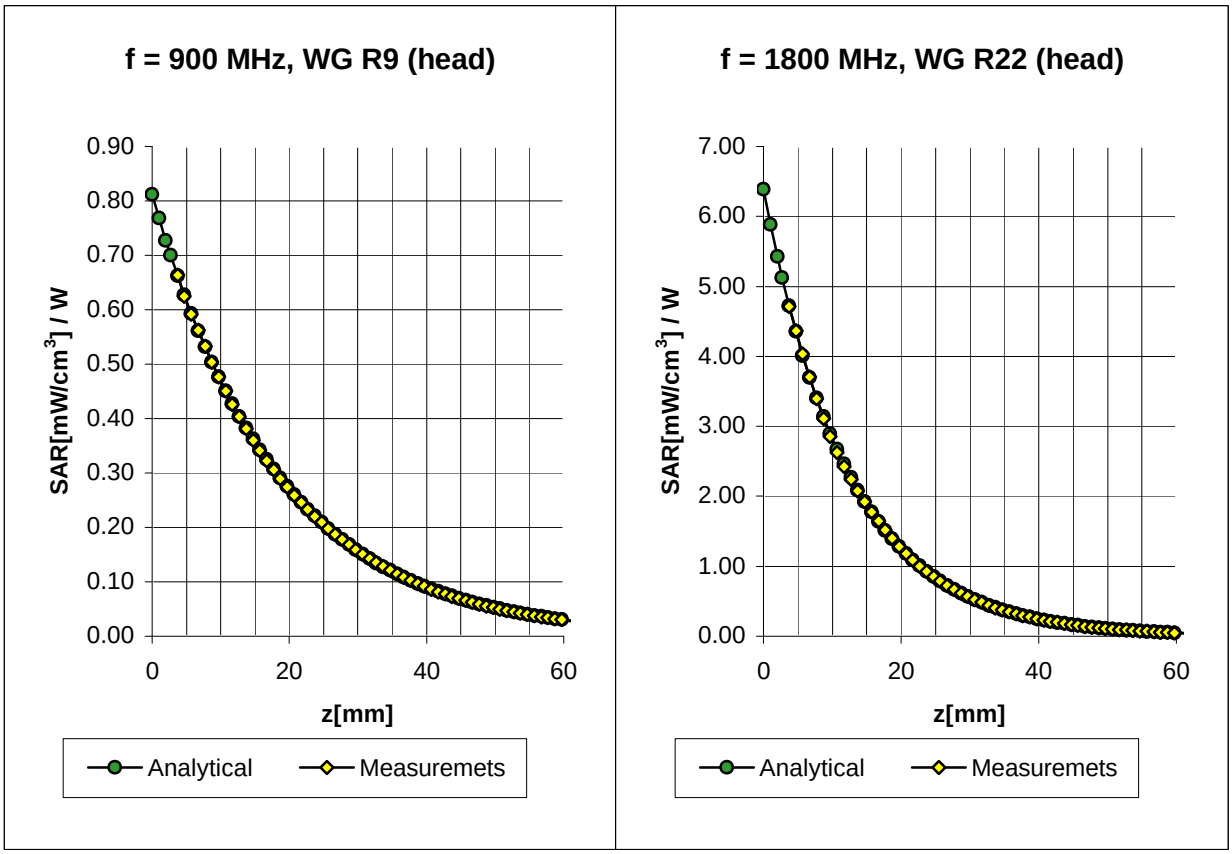
Dynamic Range f(SAR_{brain})

(TEM-Cell:ifi110)





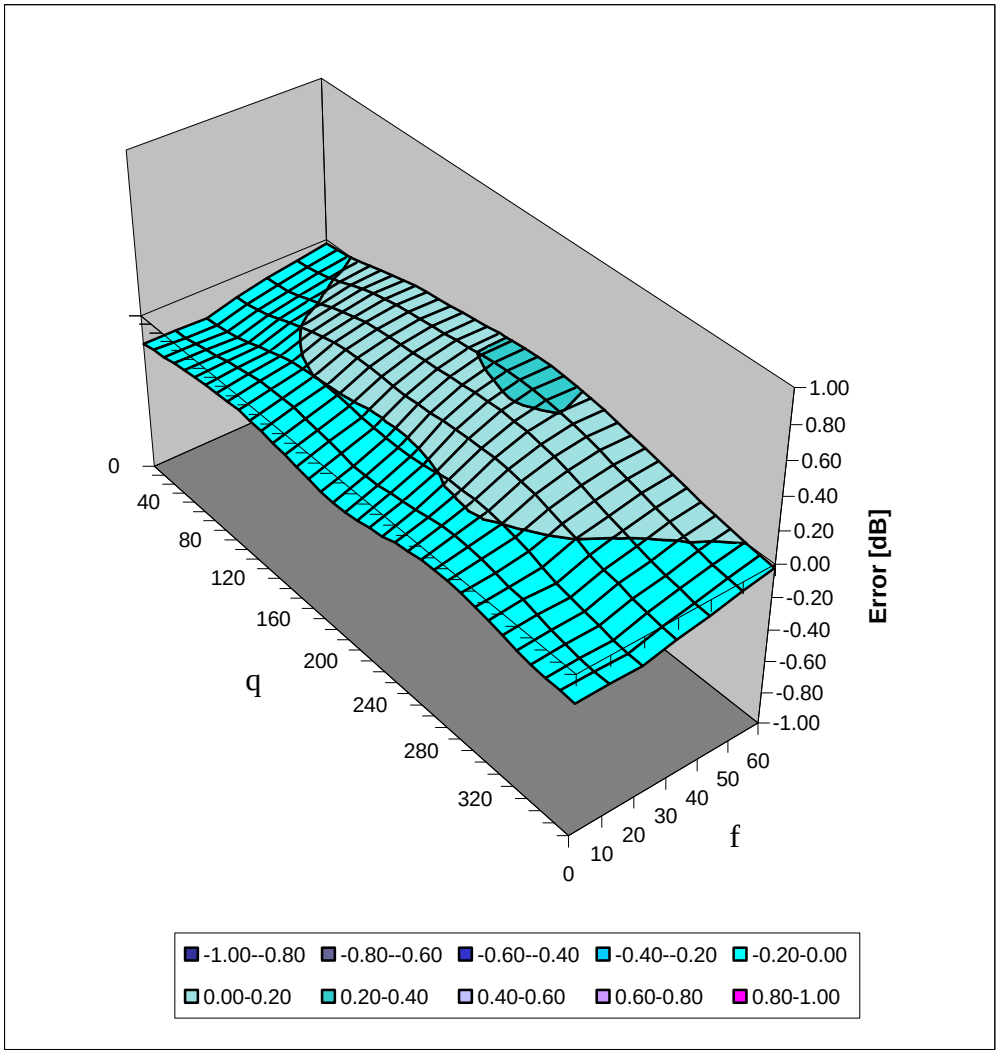
Conversion Factor Assessment



ET3DV6 SN:1590

Deviation from Isotropy in HSL

Error (q,f), f = 900 MHz



APPENDIX D - SAR SENSITIVITIES

Application Note: SAR Sensitivities

Introduction

The measured SAR-values in homogeneous phantoms depend strongly on the electrical parameters of the liquid. Liquids with exactly matching parameters are difficult to produce; there is always a small error involved in the production or measurement of the liquid parameters. The following sensitivities allow the estimation of the influence of small parameter errors on the measured SAR values. The calculations are based on an approximation formula [1] for the SAR of an electrical dipole near the phantom surface and a adapted plane wave approximation for the penetration depth. The sensitivities are given in percent SAR change per percent change in the controlling parameter:

$$S(x) = \frac{d\,SAR / SAR}{d\,x / x}$$

The controlling parameters x are:

- ε : permitivity
- σ : conductivity
- ρ : brain density (= one over integration volume)

For example: If The liquid permitivity increases by 2 percent and the sensitivity of the SAR to permitivity is -0.6 then the SAR will decrease by 1.2 percent.

The sensitivities are given for surface SAR values and averaged SAR values for 1 g and 10 g cubes and for dipole distances d of 10mm (for frequencies below 1000 MHz) and 15mm (for frequencies above 1000 MHz) from the liquid surface.

Liquid parameters are as proposed in the new standards (e.g., IEEE 1528).

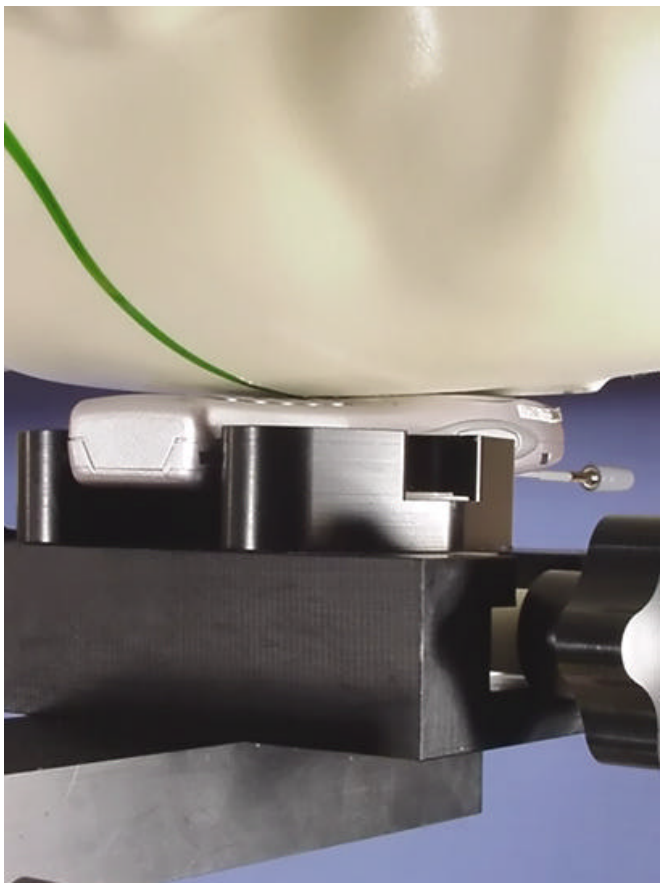
References

[1] N. Kuster and Q. Balzano, “Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300 MHz”, *IEEE Transacions on Vehicular Technology*, vol. 41(1), pp. 17-23, 1992.

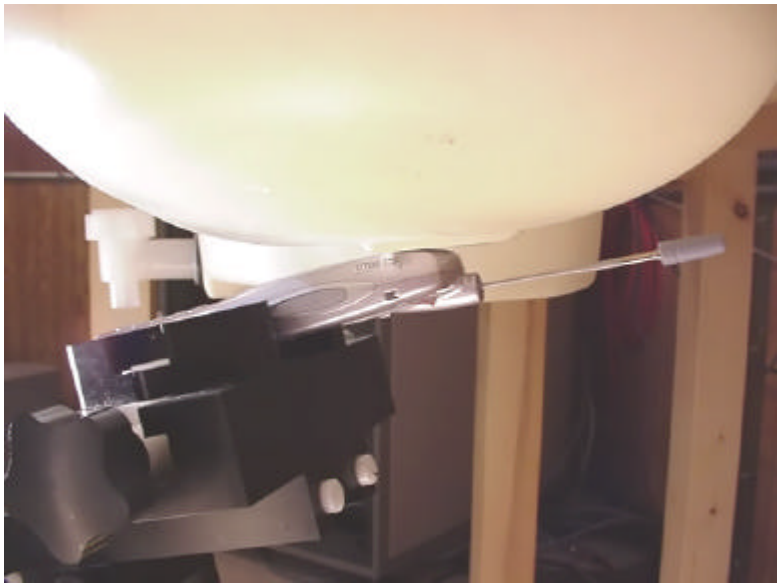
Parameter	ε	σ	ρ
f=300 MHz (εr=45.3, σ=0.87S/m, ρ=1g/cm³)			
d=15mm: Surface	- 0.41	+ 0.48	—
1 g	- 0.33	+ 0.28	0.08
10 g	- 0.26	+ 0.09	0.16
f=450 MHz (εr=43.5, σ=0.87S/m, ρ=1g/cm³)			
d=15mm: Surface	- 0.56	+ 0.67	—
1 g	- 0.46	+ 0.43	0.09
10 g	- 0.37	+ 0.22	0.17
f=835 MHz (εr=41.5, σ=0.90S/m, ρ=1g/cm³)			
d=15mm: Surface	- 0.70	+ 0.86	—
1 g	- 0.57	+ 0.59	0.10
10 g	- 0.45	+ 0.35	0.18
f=900 MHz (εr=41.5, σ=0.97S/m, ρ=1g/cm³)			
d=15mm: Surface	- 0.69	+ 0.86	—
1 g	- 0.55	+ 0.57	0.10
10 g	- 0.44	+ 0.32	0.19
f=1450 MHz (εr=40.5, σ=1.20/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.73	+ 0.91	—
1 g	- 0.55	+ 0.55	0.12
10 g	- 0.42	+ 0.27	0.22
f=1800 MHz (εr=40.0, σ=1.40S/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.73	+ 0.92	—
1 g	- 0.52	+ 0.51	0.14
10 g	- 0.38	+ 0.21	0.24
f=1900 MHz (εr=40.0, σ=1.40S/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.73	+ 0.93	—
1 g	- 0.53	+ 0.51	0.14
10 g	- 0.39	+ 0.22	0.24
f=2000 MHz (εr=40.0, σ=1.40S/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.74	+ 0.94	—
1 g	- 0.53	+ 0.52	0.14
10 g	- 0.39	+ 0.22	0.24
f=2450 MHz (εr=39.2, σ=1.80S/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.74	+ 0.93	—
1 g	- 0.49	+ 0.41	0.17
10 g	- 0.34	+ 0.12	0.28
f=3000 MHz (εr=38.5, σ=2.40S/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.75	+ 0.90	—
1 g	- 0.45	+ 0.28	0.21
10 g	- 0.32	+ 0.02	0.31

APPENDIX E - SAR TEST SETUP PHOTOGRAPHS

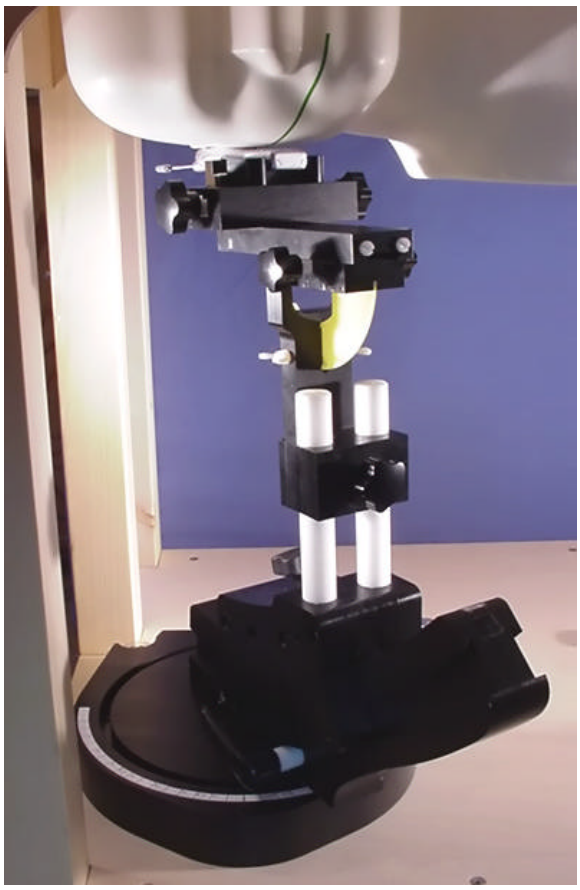
HEAD SAR TEST SETUP PHOTOGRAPHS
Left Head Section – Cheek/Touch Position

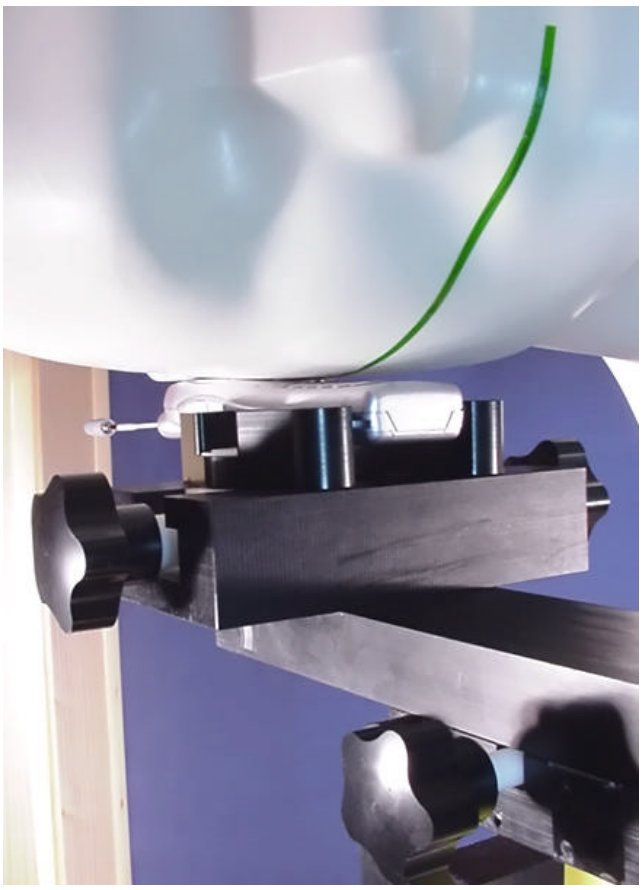


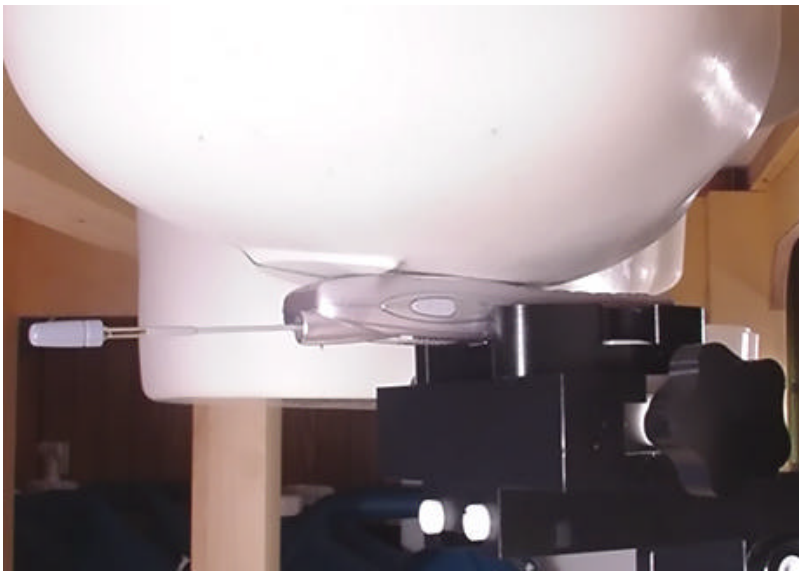
HEAD SAR TEST SETUP PHOTOGRAPHS
Left Head Section – Ear/Tilt Position



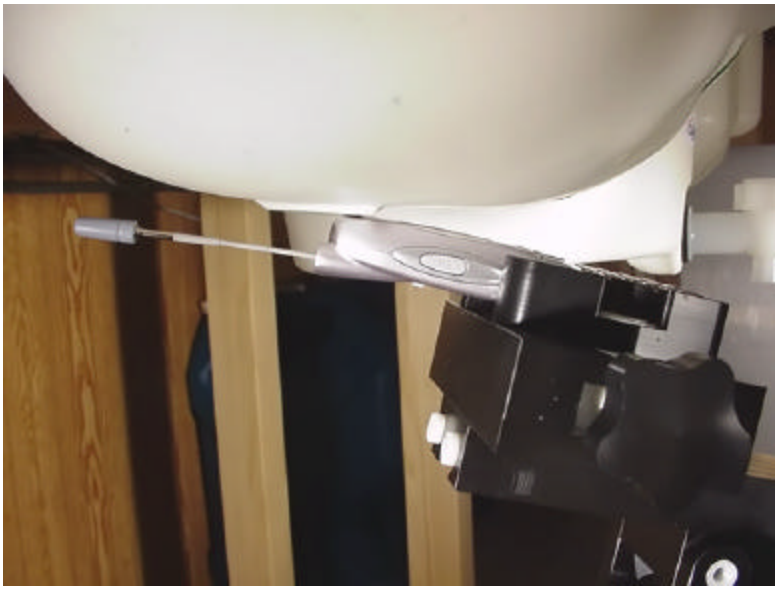
HEAD SAR TEST SETUP PHOTOGRAPHS
Right Head Section – Cheek/Touch Position







HEAD SAR TEST SETUP PHOTOGRAPHS
Right Head Section – Ear/Tilt Position



BODY SAR TEST SETUP PHOTOGRAPHS
0.0cm Separation Distance