

## **APPENDIX D: SAR CO-LOCATION**

### **SAR Co-Location Discussion**

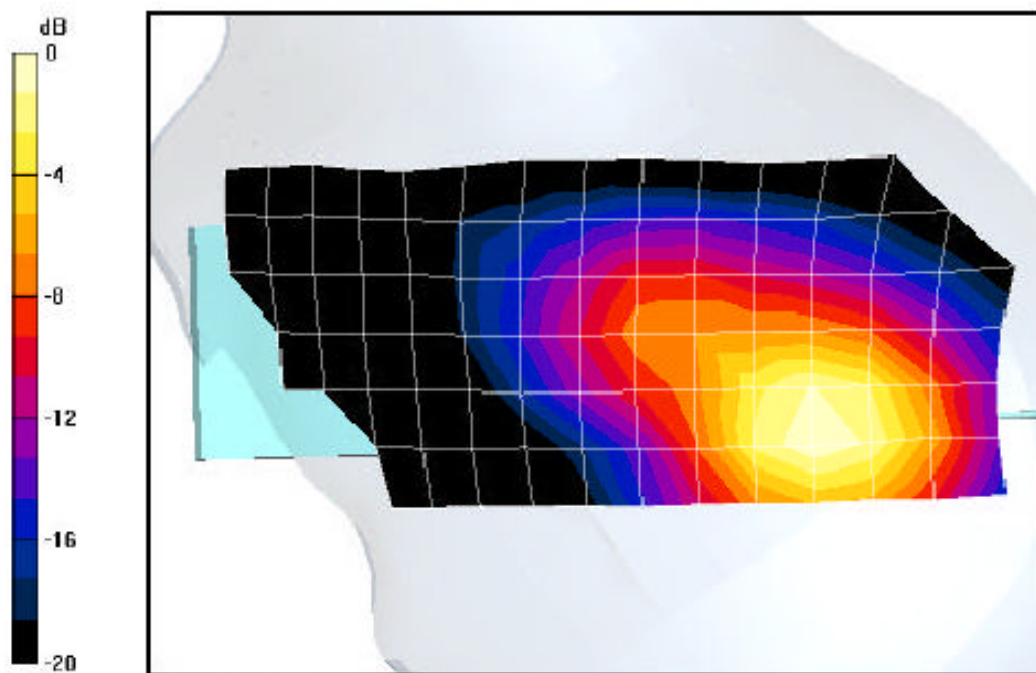
From the front view perspective the locations of the WLAN and BT antennas are respectively positioned at the bottom left and right side of the EUT far away from the antenna of the licensed transmitter. This being the case the SAR data of the licensed transmitter in the main SAR report should be placed on the Grant of Authorization. The non co-located hot spots are shown in the SAR scans (please see next page).

### **EUT Picture – Slide Down**



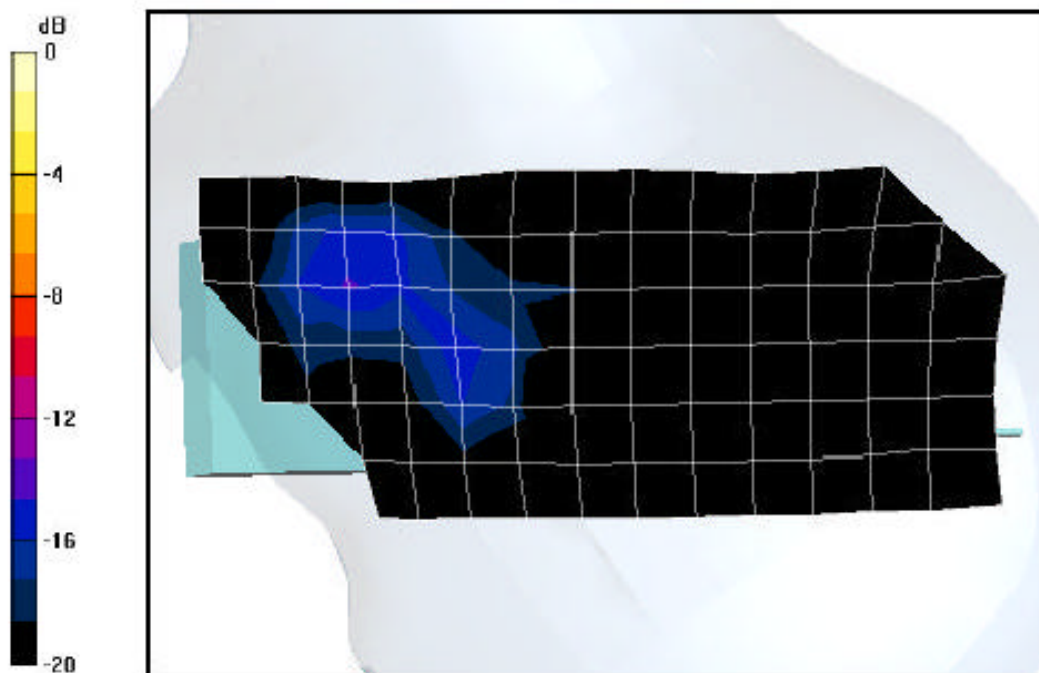
# PCTEST ENGINEERING LABORATORY, INC.

PCS mode, Left Head, Slide In, Tilt, Ant Out



0 dB = 1.6mW/g

WLAN and Bluetooth mode, Left head, Slide In, Touch, Ant Out



0 dB = 1.6mW/g

## **APPENDIX E: WLAN & BT RF EXPOSURE INFO**

## 12. SYSTEM VERIFICATION

### Tissue Verification

Table 12.1 Simulated Tissue Verification [5]

MEASURED TISSUE PARAMETERS					
Date(s)	10/01/2004 – 10/02/2004	2450 MHz Brain		2450 MHz Muscle	
Liquid Temperature (°C)	20.1	Target	Measured	Target	Measured
Dielectric Constant: $\epsilon$		39.20	41.09	52.70	52.92
Conductivity: $\sigma$		1.80	1.88	1.95	1.93

### Test System Validation

Prior to assessment, the system is verified to the  $\pm 10\%$  of the specifications at 2450MHz by using the system validation kit(s). (Graphic Plots Attached)

Table 12.2 System Validation [5]

System Validation TARGET & MEASURED							
Date:	Amb. Temp (°C)	Liquid Temp(°C)	Input Power (W)	Tissue	Targeted SAR <sub>1g</sub> (mW/g)	Measured SAR <sub>1g</sub> (mW/g)	Deviation (%)
10/01/2004	23.6	22.4	0.250	2450MHz Brain	13.1	12.9	-1.52
10/02/2004	23.9	21.7	0.250	2450MHz Brain	13.1	13.2	0.76

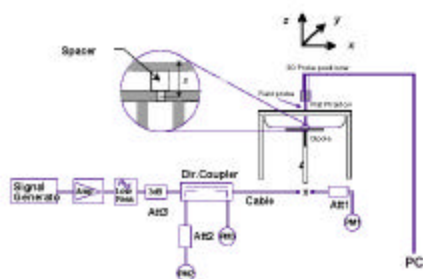


Figure 12.1 Dipole Validation Test Setup

PCTEST SAR REPORT	FCC CERTIFICATION		Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCHI730

## 13. SAR TEST DATA SUMMARY

### See Measurement Result Data Pages

The EUT was placed into continuous transmit mode using the manufacturer's software. Such test signals offer a consistent means for testing SAR and are recommended for evaluating SAR [4].

### Device Test Conditions

The EUT is powered through the internal battery. In order to verify that the device was tested at full power, conducted output power measurements were performed before and after each SAR measurement to confirm the maximum output power. If a power deviation of more than 5% occurred, the test was repeated.

PCTEST SAR REPORT		FCC CERTIFICATION		Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCHI730	Page 15 of 32

## 14. SAR DATA SUMMARY

Mixture Type: 2450MHz Brain

14.1 MEASUREMENT RESULTS (Right Head SAR – Slide Down - Touch)										
FREQUENCY		Modulation	Begin / End Average POWER <sup>†</sup>			Battery	Bluetooth	Device Test Position	Antenna Position	SAR (W/kg)
MHz	Ch.		(dBm)		Data Rate (Mbps)					
2412	01	DSSS	19.20	19.14	5.5	Extended	2402	Cheek/ Touch	In	0.0152
2412	01	DSSS	19.39	19.20	5.5	Extended	2402	Cheek/ Touch	Out	0.0174
2437	06	DSSS	19.15	18.99	5.5	Extended	2441	Cheek/ Touch	In	0.0177
2437	06	DSSS	19.19	19.15	5.5	Extended	2441	Cheek/ Touch	Out	0.0264
2462	11	DSSS	19.18	19.20	5.5	Extended	2480	Cheek/ Touch	In	0.0445
2462	11	DSSS	19.20	19.21	5.5	Extended	2480	Cheek/ Touch	Out	0.0440
2462	11	DSSS	19.18	19.17	5.5	Standard	2480	Cheek/ Touch	In	0.0420
2462	11	DSSS	19.32	19.18	5.5	Standard	2480	Cheek/ Touch	Out	0.0423
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram				

### NOTES:

- The test data reported are the worst-case SAR value with the antenna position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
  - All modes of operation were investigated, and worst-case results are reported.
  - Battery is fully charged for all readings. Standard Batteries are the only options.
- <sup>†</sup>Power Measured      ☒ Conducted      ☐ ERP      ☐ EIRP  
 4. SAR Measurement System      ☒ DASY4      ☐ IDX  
 Phantom Configuration      ☐ Left Head      ☐ Flat Phantom      ☒ Right Head  
 5. SAR Configuration      ☒ Head      ☐ Body      ☐ Hand  
 6. Test Signal Call Mode      ☒ Manu. Test Codes      ☐ Base Station Simulator
- Tissue parameters and temperatures are listed on the SAR plots.
  - Liquid tissue depth is 15.1 cm. ± 0.1

  
 Alfred Cirvithian  
 Vice President Engineering



Figure 14.1 Right Head SAR Test Setup  
-- Slide Down – Cheek/ Touch --

PCTEST SAR REPORT	FCC CERTIFICATION			Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCHI730	Page 16 of 32

## SAR DATA SUMMARY (Continued)

Mixture Type: 2450MHz Brain

14.2 MEASUREMENT RESULTS (Right Head SAR – Slide Down - Tilt)										
FREQUENCY		Modulation	Begin / End Average POWER <sup>†</sup>			Battery	Bluetooth	Device Test Position	Antenna Position	SAR (W/kg)
MHz	Ch.		(dBm)		Data Rate (Mbps)					
2437	06	DSSS	18.99	19.05	5.5	Extended	2441	Ear/ 15° Tilt	In	0.0244
2437	06	DSSS	19.05	19.02	5.5	Extended	2441	Ear/ 15° Tilt	Out	0.0238
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram				

### NOTES:

- The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
- All modes of operation were investigated, and worst-case results are reported.

- Battery is fully charged for all readings. Standard Batteries are the only options.

†Power Measured ☒ Conducted ☐ ERP ☐ EIRP

- SAR Measurement System ☒ DASY4 ☐ IDX  
Phantom Configuration ☐ Left Head ☐ Flat Phantom ☒ Right Head
- SAR Configuration ☒ Head ☐ Body ☐ Hand
- Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator

- Tissue parameters and temperatures are listed on the SAR plots.

- Liquid tissue depth is 15.1 cm. ± 0.1

  
Alfred Cirwithian  
Vice President Engineering



Figure 14.2 Right Head SAR Test Setup  
-- Slide Down - Ear/ 15° Tilt --

PCTEST SAR REPORT	FCC CERTIFICATION			Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCH1730	Page 17 of 32



## 14. SAR DATA SUMMARY

Mixture Type: 2450MHz Brain

14.3 MEASUREMENT RESULTS (Right Head SAR – Slide Up - Touch)										
FREQUENCY		Modulation	Begin / End Average POWER <sup>†</sup>			Battery	Bluetooth	Device Test Position	Antenna Type	SAR (W/kg)
MHz	Ch.		(dBm)		Data Rate (Mbps)					
2412	01	DSSS	19.23	19.331	5.5	Extended	2402	Cheek/ Touch	In	0.0338
2412	01	DSSS	19.31	19.32	5.5	Extended	2402	Cheek/ Touch	Out	0.0275
2437	06	DSSS	19.26	19.24	5.5	Extended	2441	Cheek/ Touch	In	0.0400
2437	06	DSSS	19.24	19.20	5.5	Extended	2441	Cheek/ Touch	Out	0.0380
2462	11	DSSS	19.36	19.34	5.5	Extended	2480	Cheek/ Touch	In	0.0534
2462	11	DSSS	19.34	19.21	5.5	Extended	2480	Cheek/ Touch	Out	0.0481
2462	11	DSSS	19.38	19.28	5.5	Standard	2480	Cheek/ Touch	In	0.0499
2462	11	DSSS	19.41	19.46	5.5	Standard	2480	Cheek/ Touch	Out	0.0452
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram				

### NOTES:

- The test data reported are the worst-case SAR value with the antenna position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
- All modes of operation were investigated, and worst-case results are reported.
- Battery is fully charged for all readings. Standard Batteries are the only options.

- †Power Measured ☒ Conducted ☐ ERP ☐ EIRP
4. SAR Measurement System ☒ DASY4 ☐ IDX
- Phantom Configuration ☐ Left Head ☐ Flat Phantom ☒ Right Head
5. SAR Configuration ☒ Head ☐ Body ☐ Hand
6. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
7. Tissue parameters and temperatures are listed on the SAR plots.
8. Liquid tissue depth is 15.1 cm. ± 0.1

  
Alfred Cirwithian  
Vice President Engineering



Figure 14.3 Right Head SAR Test Setup  
-- Slide Up – Cheek/ Touch --

PCTEST SAR REPORT	FCC CERTIFICATION			Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCHI730	Page 18 of 32

## SAR DATA SUMMARY (Continued)

Mixture Type: 2450MHz Brain

14.4 MEASUREMENT RESULTS (Right Head SAR – Slide Up - Tilt)										
FREQUENCY		Modulation	Begin / End Average POWER <sup>†</sup>			Battery	Bluetooth	Device Test Position	Antenna Type	SAR (W/kg)
MHz	Ch.		(dBm)		Data Rate (Mbps)					
2437	06	DSSS	19.25	19.26	5.5	Extended	2441	Ear/ 15° Tilt	In	0.0222
2437	06	DSSS	19.26	19.22	5.5	Extended	2441	Ear/ 15° Tilt	Out	0.0251
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram				

### NOTES:

- The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
- All modes of operation were investigated, and worst-case results are reported.

- Battery is fully charged for all readings. Standard Batteries are the only options.

- †Power Measured ☒ Conducted ☐ ERP ☐ EIRP
4. SAR Measurement System ☒ DASY4 ☐ IDX
- Phantom Configuration ☐ Left Head ☐ Flat Phantom ☒ Right Head
5. SAR Configuration ☒ Head ☐ Body ☐ Hand
6. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator

- Tissue parameters and temperatures are listed on the SAR plots.

- Liquid tissue depth is 15.1 cm. ± 0.1

  
Alfred Cirvithian  
Vice President Engineering



Figure 14.4 Right Head SAR Test Setup  
-- Slide Up - Ear/ 15° Tilt --

PCTEST SAR REPORT	FCC CERTIFICATION			Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCHI730	Page 19 of 32

## 14. SAR DATA SUMMARY

Mixture Type: 2450MHz Brain

14.5 MEASUREMENT RESULTS (Left Head SAR – Slide Down - Touch)										
FREQUENCY		Modulation	Begin / End Average POWER <sup>†</sup>			Battery	Bluetooth	Device Test Position	Antenna Position	SAR (W/kg)
MHz	Ch.		(dBm)		Data Rate (Mbps)					
2437	06	DSSS	19.22	19.24	1.0	Extended	OFF	Cheek/ Touch	In	0.0474
2437	06	DSSS	19.24	19.18	2.0	Extended	OFF	Cheek/ Touch	In	0.0533
2437	06	DSSS	19.38	19.35	5.5	Extended	OFF	Cheek/ Touch	In	0.0567
2437	06	DSSS	19.30	19.30	11.0	Extended	OFF	Cheek/ Touch	In	0.0517
2412	01	DSSS	19.08	19.00	5.5	Extended	2402	Cheek/ Touch	In	0.0281
2412	01	DSSS	18.84	18.89	5.5	Extended	2402	Cheek/ Touch	Out	0.0362
2437	06	DSSS	19.22	19.24	5.5	Extended	2441	Cheek/ Touch	In	0.0472
2437	06	DSSS	19.24	19.24	5.5	Extended	2441	Cheek/ Touch	Out	0.0508
2462	11	DSSS	19.22	19.08	5.5	Extended	2480	Cheek/ Touch	In	0.0342
2462	11	DSSS	19.25	19.12	5.5	Extended	2480	Cheek/ Touch	Out	0.0415
2437	06	DSSS	19.24	19.22	5.5	Standard	2480	Cheek/ Touch	In	0.0481
2437	06	DSSS	19.22	19.20	5.5	Standard	2480	Cheek/ Touch	Out	0.0328
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram				

### NOTES:

- The test data reported are the worst-case SAR value with the antenna position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
- All modes of operation were investigated, and worst-case results are reported.
- Battery is fully charged for all readings. Standard Batteries are the only options.

- †Power Measured ☒ Conducted ☐ ERP ☐ EIRP
- SAR Measurement System ☒ DASY4 ☐ IDX
- Phantom Configuration ☒ Left Head ☐ Flat Phantom ☐ Right Head
- SAR Configuration ☒ Head ☐ Body ☐ Hand
- Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator

- Tissue parameters and temperatures are listed on the SAR plots.
- Liquid tissue depth is 15.1 cm. ± 0.1

  
Alfred Cirvethian  
Vice President Engineering



Figure 14.5 Left Head SAR Test Setup  
-- Slide Down -- Cheek/ Touch--

PCTEST SAR REPORT	FCC CERTIFICATION			Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCHI730	Page 20 of 32

# SAR DATA SUMMARY (Continued)

Mixture Type: 2450MHz Brain

14.6 MEASUREMENT RESULTS (Left Head SAR – Slide Down - Tilt)										
FREQUENCY		Modulation	Begin / End Average POWER <sup>†</sup>			Battery	Bluetooth	Device Test Position	Antenna Position	SAR (W/kg)
MHz	Ch.		(dBm)		Data Rate (Mbps)					
2437	06	DSSS	19.24	19.20	5.5	Extended	2441	Ear/ 15° Tilt	In	0.0259
2437	06	DSSS	19.14	19.19	5.5	Extended	2441	Ear/ 15° Tilt	Out	0.0349
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram				

## NOTES:

- The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
  - All modes of operation were investigated, and worst-case results are reported.
  - Battery is fully charged for all readings. Standard Batteries are the only options.
- <sup>†</sup>Power Measured      ☒ Conducted      ☐ ERP      ☐ EIRP
- SAR Measurement System      ☒ DASY4      ☐ IDX  
 Phantom Configuration      ☒ Left Head      ☐ Flat Phantom      ☐ Right Head
  - SAR Configuration      ☒ Head      ☐ Body      ☐ Hand
  - Test Signal Call Mode      ☒ Manu. Test Codes      ☐ Base Station Simulator
  - Tissue parameters and temperatures are listed on the SAR plots.
  - Liquid tissue depth is 15.1 cm. ± 0.1

  
 Alfred Cirwithian  
 Vice President Engineering



Figure 14.6 Left Head SAR Test Setup  
-- Slide Down - Ear/ 15° Tilt --

PCTEST SAR REPORT	FCC CERTIFICATION			Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCHI730	Page 21 of 32

## 14. SAR DATA SUMMARY

Mixture Type: 2450MHz Brain

14.7 MEASUREMENT RESULTS (Left Head SAR – Slide Up - Touch)										
FREQUENCY		Modulation	Begin / End Average POWER <sup>†</sup>			Battery	Bluetooth	Device Test Position	Antenna Type	SAR (W/kg)
MHz	Ch.		(dBm)		Data Rate (Mbps)					
2412	01	DSSS	19.26	19.20	5.5	Extended	2402	Cheek/ Touch	In	0.0349
2412	01	DSSS	19.22	19.24	5.5	Extended	2402	Cheek/ Touch	Out	0.0304
2437	06	DSSS	19.23	19.25	5.5	Extended	2441	Cheek/ Touch	In	0.0605
2437	06	DSSS	19.25	19.27	5.5	Extended	2441	Cheek/ Touch	Out	0.0540
2462	11	DSSS	19.24	19.19	5.5	Extended	2480	Cheek/ Touch	In	0.0459
2462	11	DSSS	19.22	19.18	5.5	Extended	2480	Cheek/ Touch	Out	0.0633
2462	11	DSSS	19.26	19.24	5.5	Standard	2480	Cheek/ Touch	In	0.0429
2462	11	DSSS	19.24	19.21	5.5	Standard	2480	Cheek/ Touch	Out	0.0480
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram				

### NOTES:

- The test data reported are the worst-case SAR value with the antenna position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
- All modes of operation were investigated, and worst-case results are reported.
- Battery is fully charged for all readings. Standard Batteries are the only options.

- †Power Measured ☒ Conducted ☐ ERP ☐ EIRP
4. SAR Measurement System ☒ DASY4 ☐ IDX
- Phantom Configuration ☒ Left Head ☐ Flat Phantom ☐ Right Head
5. SAR Configuration ☒ Head ☐ Body ☐ Hand
6. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
7. Tissue parameters and temperatures are listed on the SAR plots.
8. Liquid tissue depth is 15.1 cm. ± 0.1

  
Alfred Cirvithian  
Vice President Engineering



Figure 14.7 Left Head SAR Test Setup  
-- Slide Up -- Cheek/ Touch--

PCTEST SAR REPORT	FCC CERTIFICATION			Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCH1730	Page 22 of 32

# SAR DATA SUMMARY (Continued)

Mixture Type: 2450MHz Brain

14.8 MEASUREMENT RESULTS (Left Head SAR – Slide Up - Tilt)										
FREQUENCY		Modulation	Begin / End Average POWER <sup>‡</sup>			Battery	Bluetooth	Device Test Position	Antenna Type	SAR (W/kg)
MHz	Ch.		(dBm)		Data Rate (Mbps)					
2437	06	DSSS	19.23	19.26	5.5	Extended	2441	Ear/ 15° Tilt	In	0.0196
2437	06	DSSS	19.27	19.28	5.5	Extended	2441	Ear/ 15° Tilt	Out	0.0209
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram				

**NOTES:**

- The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
- All modes of operation were investigated, and worst-case results are reported.
- Battery is fully charged for all readings. Standard Batteries are the only options.
- ‡Power Measured

☒ Conducted
 ☐ ERP
 ☐ EIRP
- SAR Measurement System

☒ DASY4
 ☐ IDX
- Phantom Configuration

☐ Left Head
 ☐ Flat Phantom
 ☒ Right Head
- SAR Configuration

☒ Head
 ☐ Body
 ☐ Hand
- Test Signal Call Mode

☒ Manu. Test Codes
 ☐ Base Station Simulator
- Tissue parameters and temperatures are listed on the SAR plots.
- Liquid tissue depth is 15.1 cm. ± 0.1



Alfred Cirvithian  
Vice President Engineering



Figure 14.8 Left Head SAR Test Setup  
-- Slide Up - Ear/ 15° Tilt --

PCTEST SAR REPORT	FCC CERTIFICATION			Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCH1730	Page 23 of 32

## 14. SAR DATA SUMMARY

Mixture Type: 2450MHz Muscle

### 14.9 MEASUREMENT RESULTS (Body SAR – Slide Down)

FREQUENCY		Modulation	Begin / End Average POWER <sup>1</sup>			Battery	Bluetooth	Separation Distance (cm)	Antenna Type	SAR (W/kg)
MHz	Ch.		(dBm)		Data Rate (Mbps)					
2412	01	DSSS	19.35	19.21	5.5	Extended	2402	1.5 cm w/ Holster	In	0.0110
2412	01	DSSS	19.21	19.04	5.5	Extended	2402	1.5 cm w/ Holster	Out	0.0099
2437	06	DSSS	19.21	19.20	5.5	Extended	2441	1.5 cm w/ Holster	In	0.0177
2437	06	DSSS	19.25	19.21	5.5	Extended	2441	1.5 cm w/ Holster	Out	0.0185
2462	11	DSSS	19.18	19.10	5.5	Extended	2480	1.5 cm w/ Holster	In	0.0190
2462	11	DSSS	19.10	19.08	5.5	Extended	2480	1.5 cm w/ Holster	Out	0.0218
2462	11	DSSS	19.23	19.18	5.5	Standard	2480	1.5 cm w/ Holster	In	0.0162
2462	11	DSSS	19.18	19.10	5.5	Standard	2480	1.5 cm w/ Holster	Out	0.0168
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram				

#### NOTES:

- The test data reported are the worst-case SAR value with the antenna position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
  - All modes of operation were investigated, and worst-case results are reported.
  - Battery is fully charged for all readings. Standard Batteries are the only options.
- <sup>†</sup>Power Measured      ☒ Conducted      ☐ ERP      ☐ EIRP  
 4. SAR Measurement System      ☒ DASY4      ☐ IDX  
 Phantom Configuration      ☐ Left Head      ☒ Flat Phantom      ☐ Right Head  
 5. SAR Configuration      ☐ Head      ☒ Body      ☐ Hand  
 6. Test Signal Call Mode      ☒ Manu. Test Codes      ☐ Base Station Simulator  
 7. Tissue parameters and temperatures are listed on the SAR plots.  
 8. Liquid tissue depth is 15.1 cm. ± 0.1

  
 Alfred Cirwithian  
 Vice President Engineering



Figure 14.9 Body SAR Test Setup  
-- Slide Down -- w/ Holster --

PCTEST SAR REPORT	FCC CERTIFICATION			Reviewed by: Quality Manager
SAR Filename: SAR.240930561.ACJ	Test Dates: Oct. 1-2, 2004	Phone Type: Samsung Dual-Band Phone w/ WLAN & Bluetooth	FCC ID: A3LSCHI730	Page 24 of 32

## **APPENDIX F: WLAN & BT PLOTS**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Right Section

Test Date: 10-02-2004; Ambient Temp: 23.5°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## Ch.11, Slide In, Touch, Ant In, Extended Battery

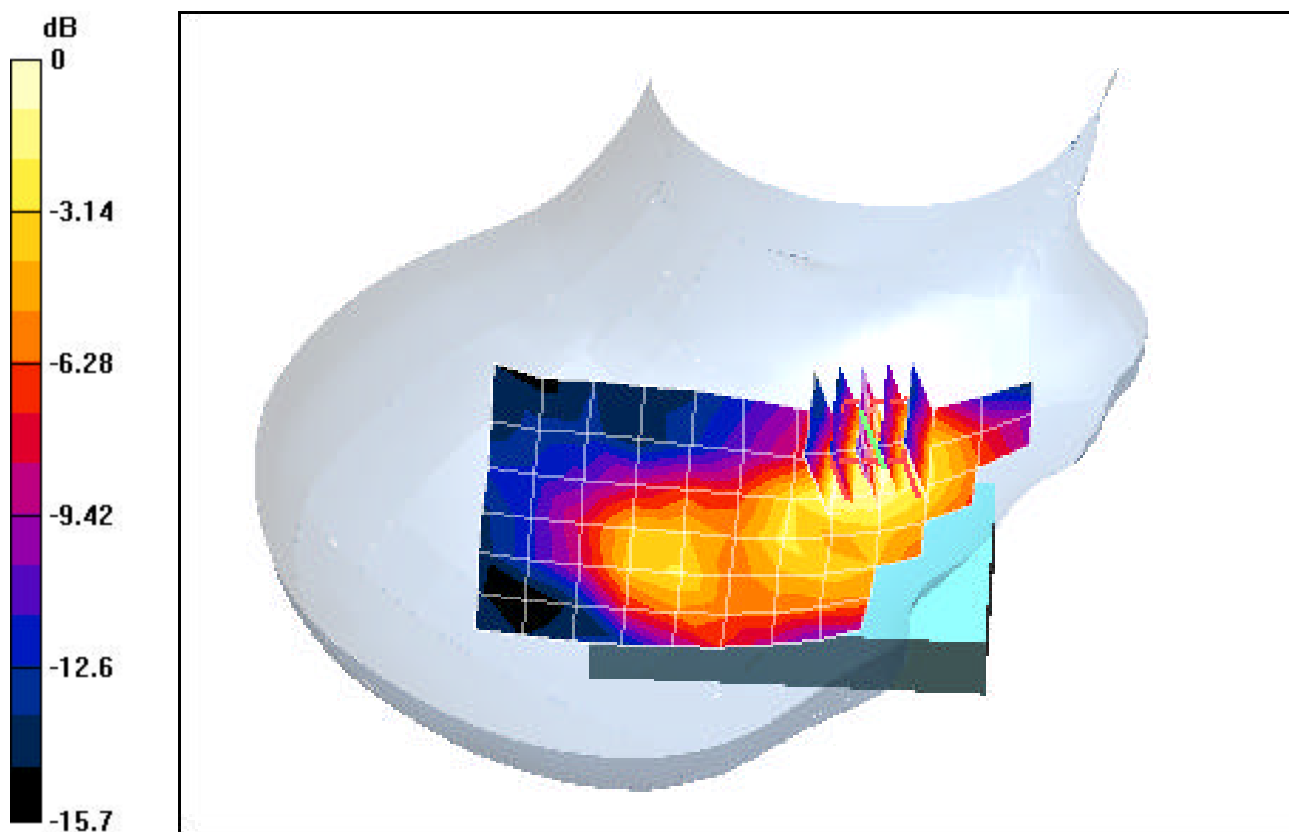
**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.25 V/m

Peak SAR (extrapolated) = 0.075 W/kg

**SAR(1 g) = 0.044 mW/g; SAR(10 g) = 0.026 mW/g**



0 dB = 0.054mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Right Section

Test Date: 10-02-2004; Ambient Temp: 23.5°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## Ch.06, Slide In, Tilt, Ant In, Extended Battery

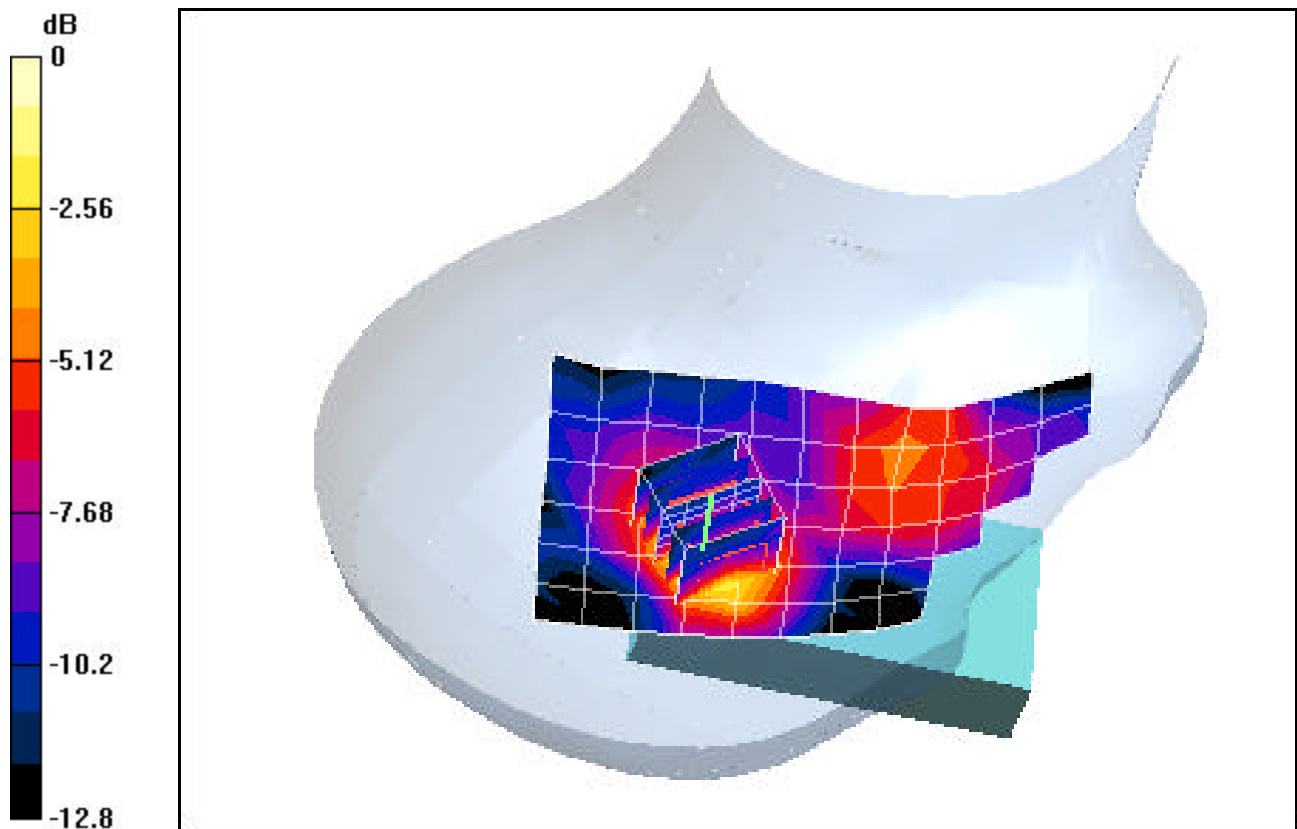
**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.06 V/m

Peak SAR (extrapolated) = 0.042 W/kg

**SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.013 mW/g**



0 dB = 0.030mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Right Section

Test Date: 10-02-2004; Ambient Temp: 23.5°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## Ch.11, Slide Out, Touch, Ant In, Extended Battery

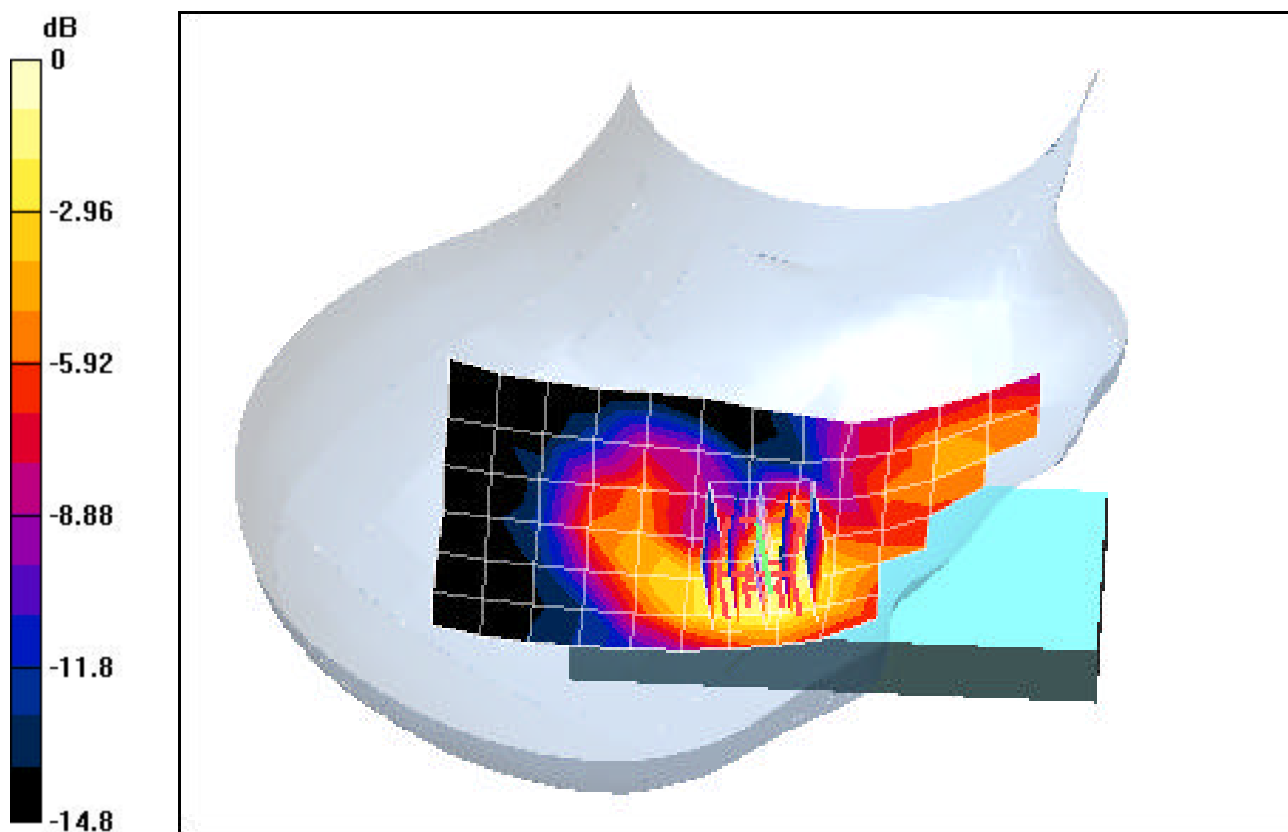
**Area Scan (7x15x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.44 V/m

Peak SAR (extrapolated) = 0.089 W/kg

**SAR(1 g) = 0.053 mW/g; SAR(10 g) = 0.031 mW/g**



0 dB = 0.063mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Right Section

Test Date: 10-01-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.7°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## Ch.06, Slide Out, Tilt, Ant Out, Extended Battery

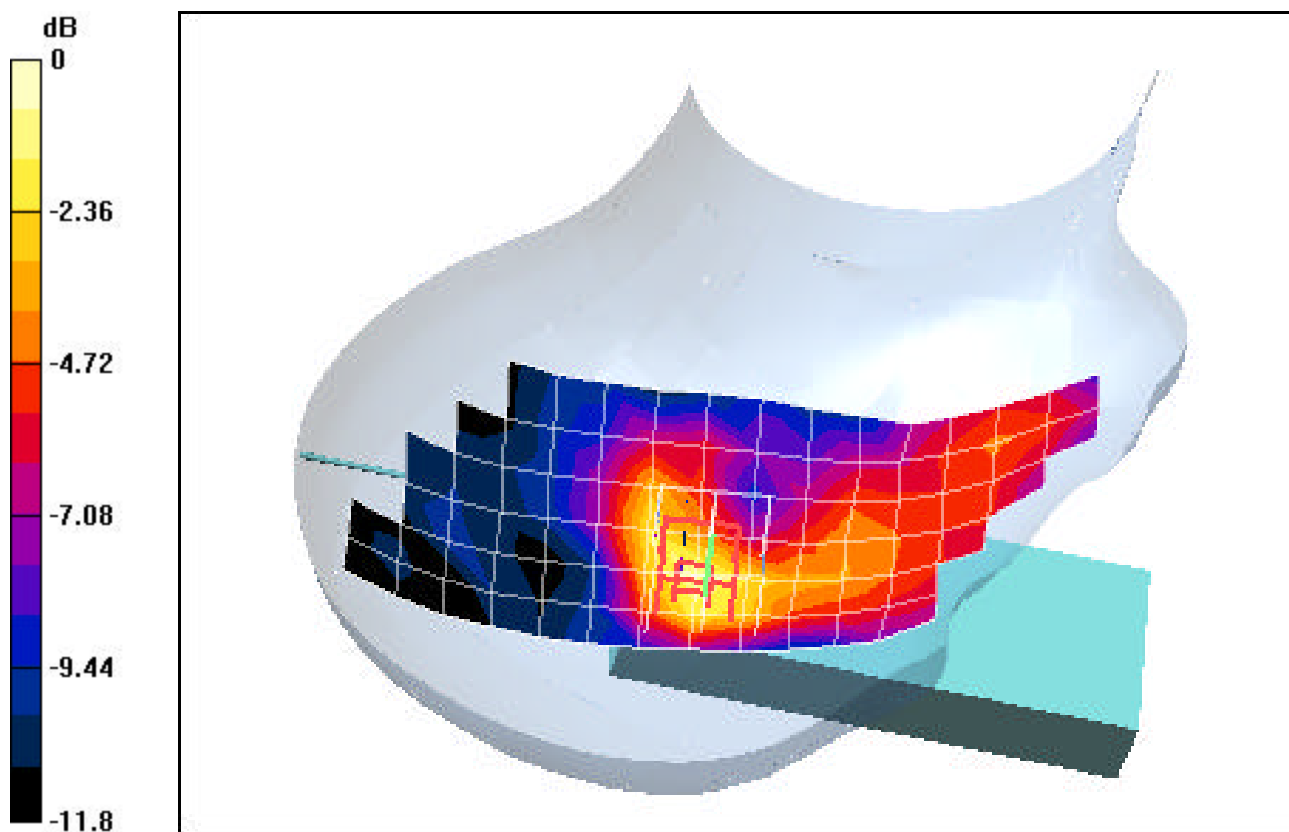
**Area Scan (7x20x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.91 V/m

Peak SAR (extrapolated) = 0.046 W/kg

**SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.014 mW/g**



0 dB = 0.030mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**UT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Left Section

Test Date: 10-01-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.7°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## **Ch.06, Slide In, Touch, Ant Out, Extended Battery**

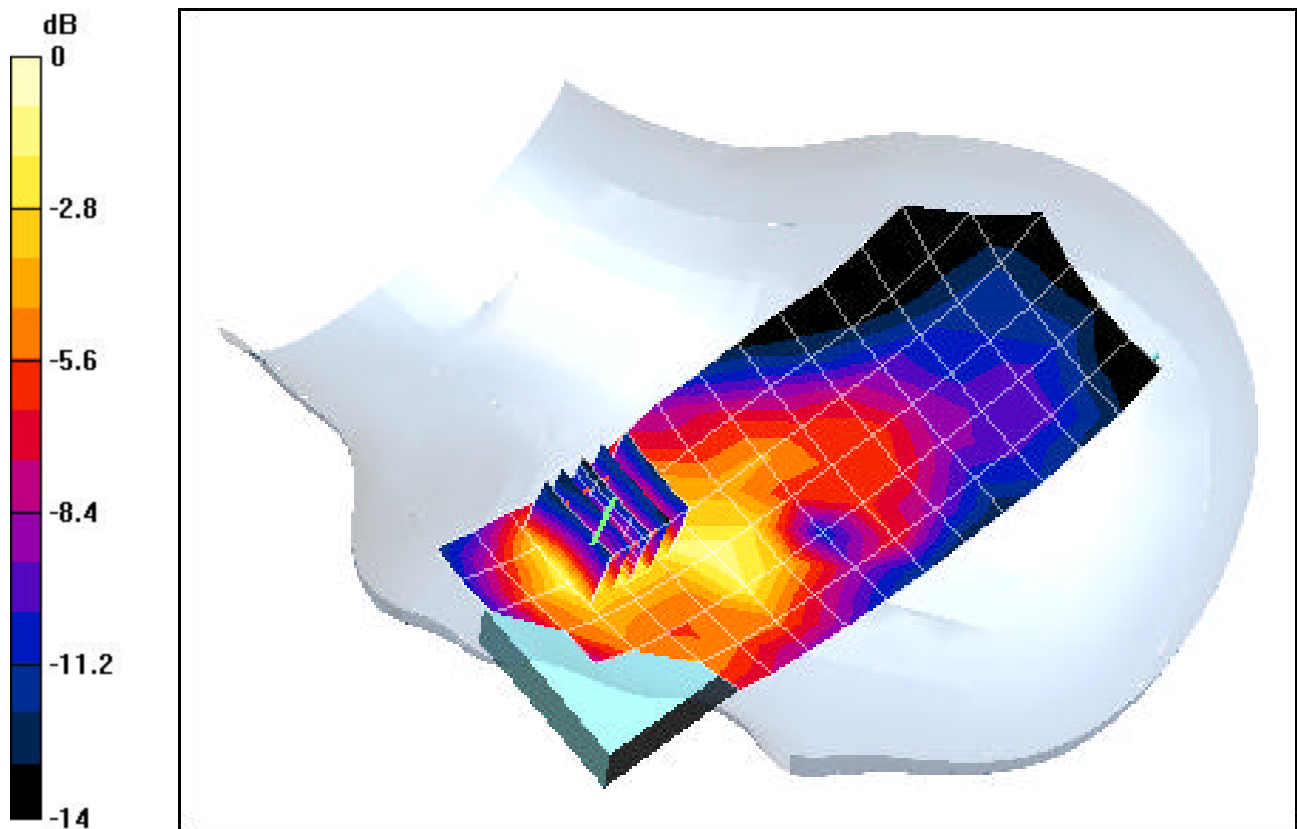
**Area Scan (7x16x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.86 V/m

Peak SAR (extrapolated) = 0.092 W/kg

**SAR(1 g) = 0.051 mW/g; SAR(10 g) = 0.028 mW/g**



0 dB = 0.063mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Left Section

Test Date: 10-01-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.7°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## Ch.06, Slide In, Tilt, Ant Out, Extended Battery

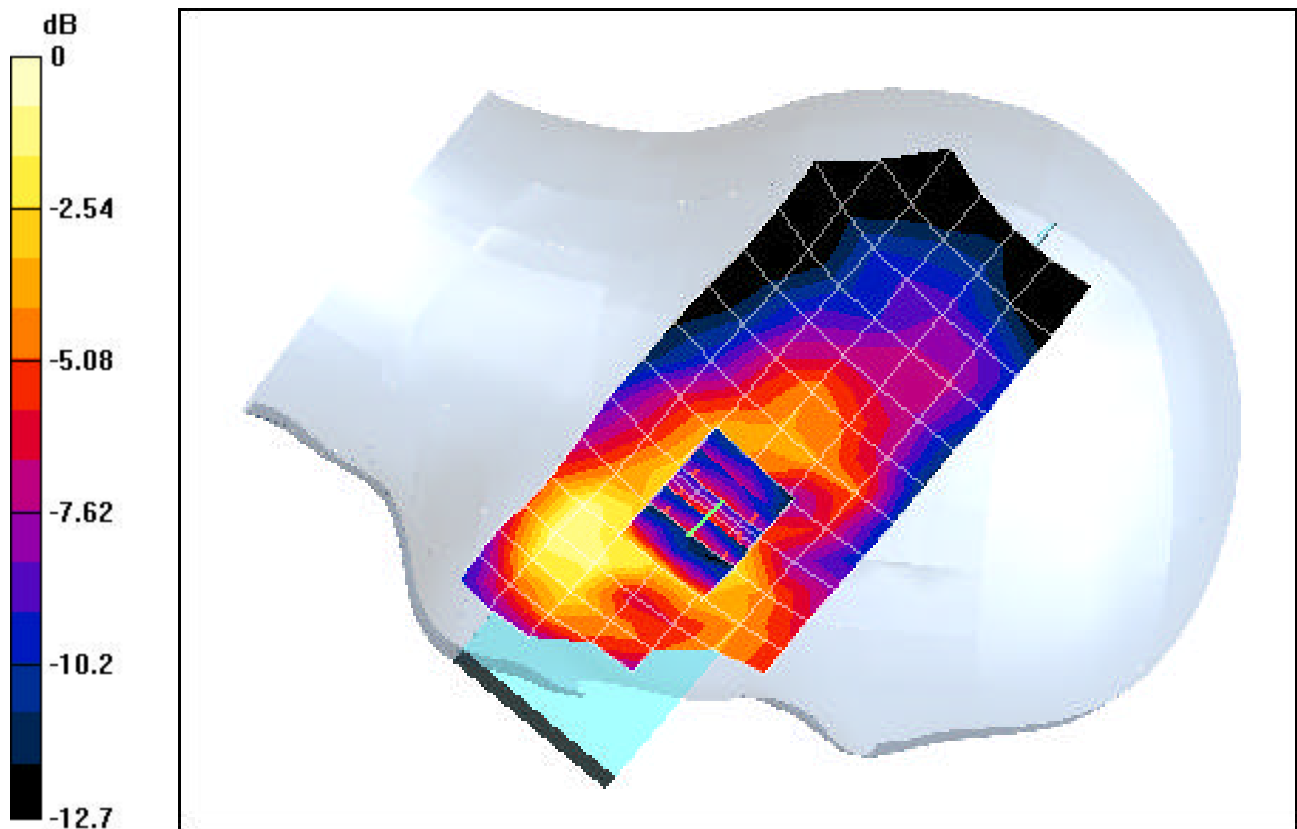
**Area Scan (7x16x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.1 V/m

Peak SAR (extrapolated) = 0.060 W/kg

**SAR(1 g) = 0.035 mW/g; SAR(10 g) = 0.020 mW/g**



0 dB = 0.043mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Left Section

Test Date: 10-01-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.7°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## Ch.11, Slide Out, Touch, Ant Out, Extended Battery

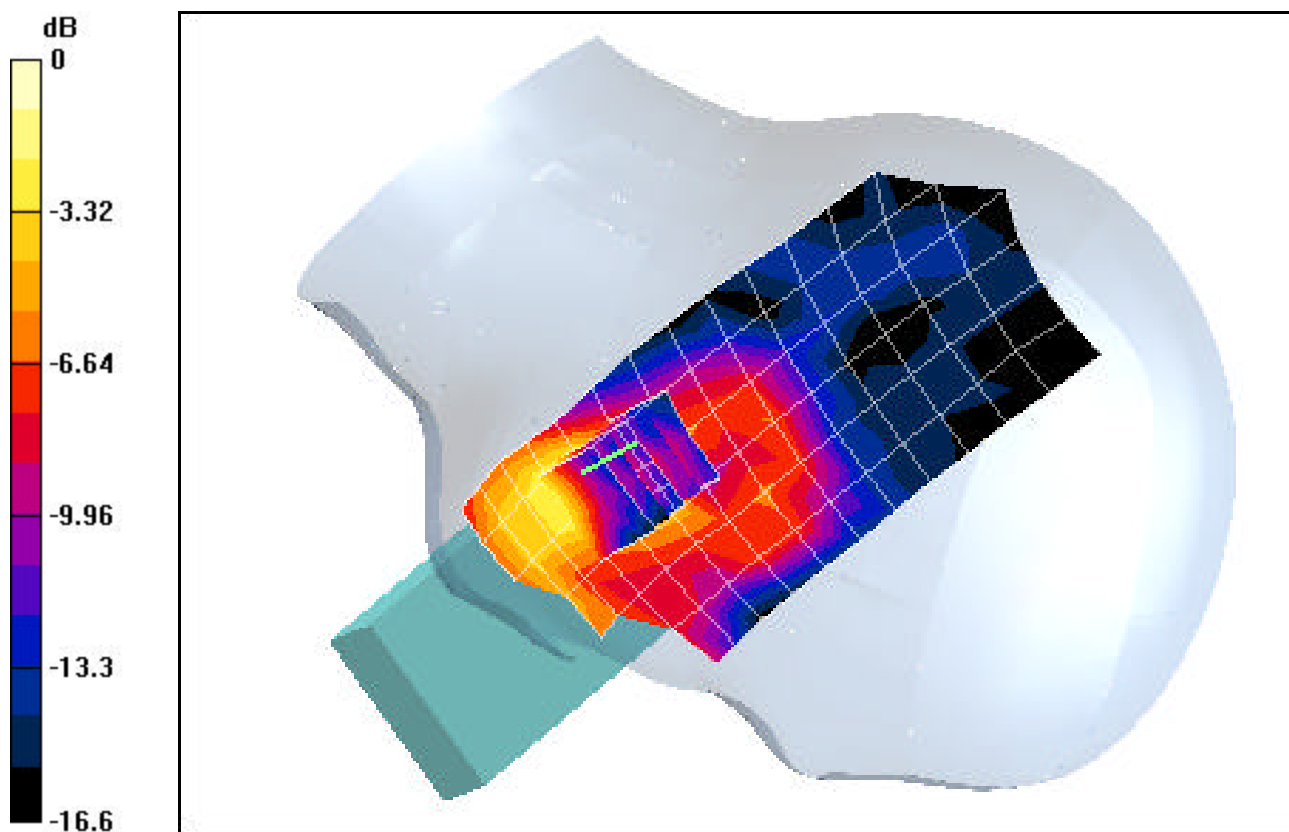
**Area Scan (7x20x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.86 V/m

Peak SAR (extrapolated) = 0.119 W/kg

**SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.033 mW/g**



0 dB = 0.076mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Left Section

Test Date: 10-01-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.7°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## Ch.06, Slide Out, Tilt, Ant Out, Extended Battery

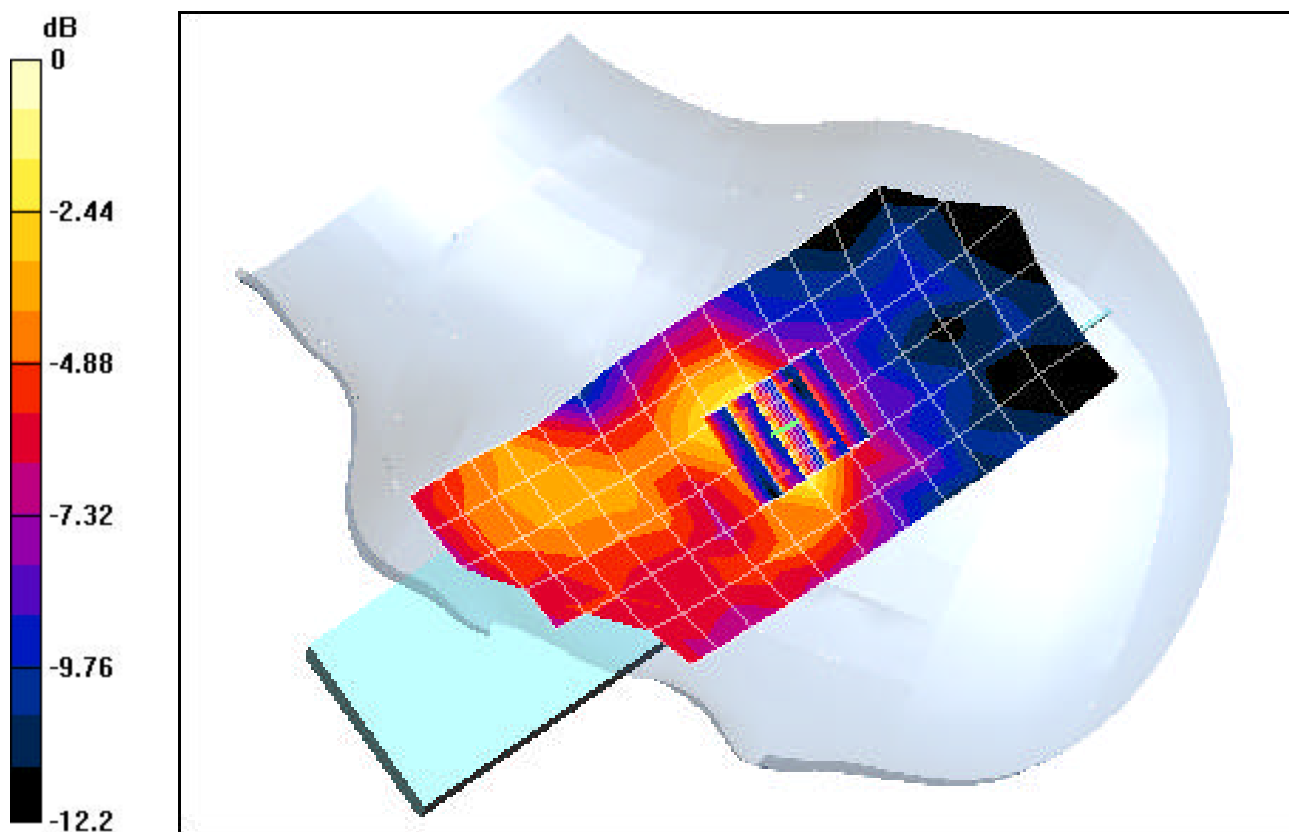
**Area Scan (7x20x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.58 V/m

Peak SAR (extrapolated) = 0.038 W/kg

**SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.012 mW/g**



0 dB = 0.026mW/g



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Muscle ( $\sigma = 1.93$  mho/m,  $\epsilon_r = 52.92$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Flat Section; Space: 1.5 cm; Tested with Beltclip

Test Date: 10-02-2004; Ambient Temp: 23.7°C; Tissue Temp: 22.3°C

Probe: ES3DV2 - SN3022; ConvF(4.2, 4.2, 4.2); Calibrated: 9/24/2004

Sensor -Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## Ch.11, Slide In, Ant Out, Extended Battery

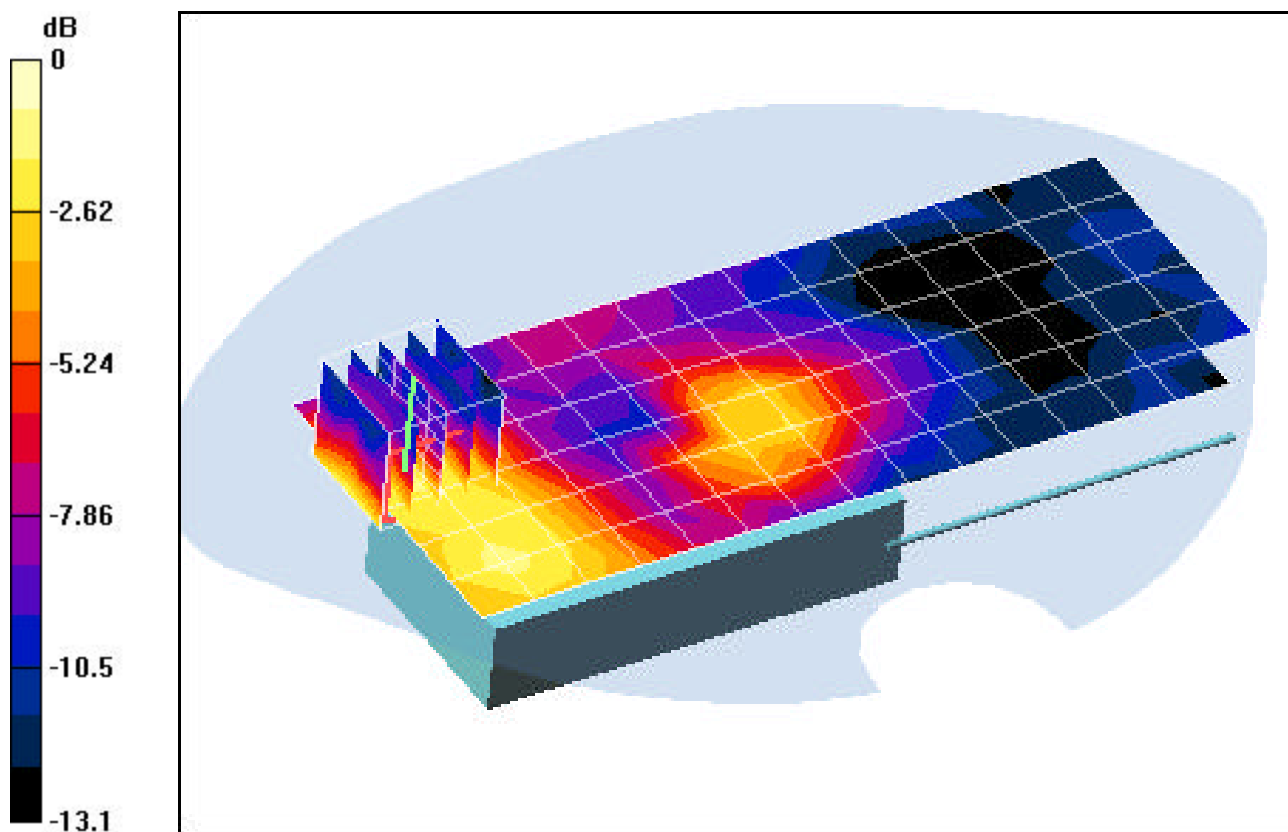
**Area Scan (7x16x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.92 V/m

Peak SAR (extrapolated) = 0.040 W/kg

**SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.013 mW/g**



0 dB = 0.026mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Left Section

Test Date: 10-01-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.7°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## Ch.11, Slide Out, Touch, Ant Out, Extended Battery

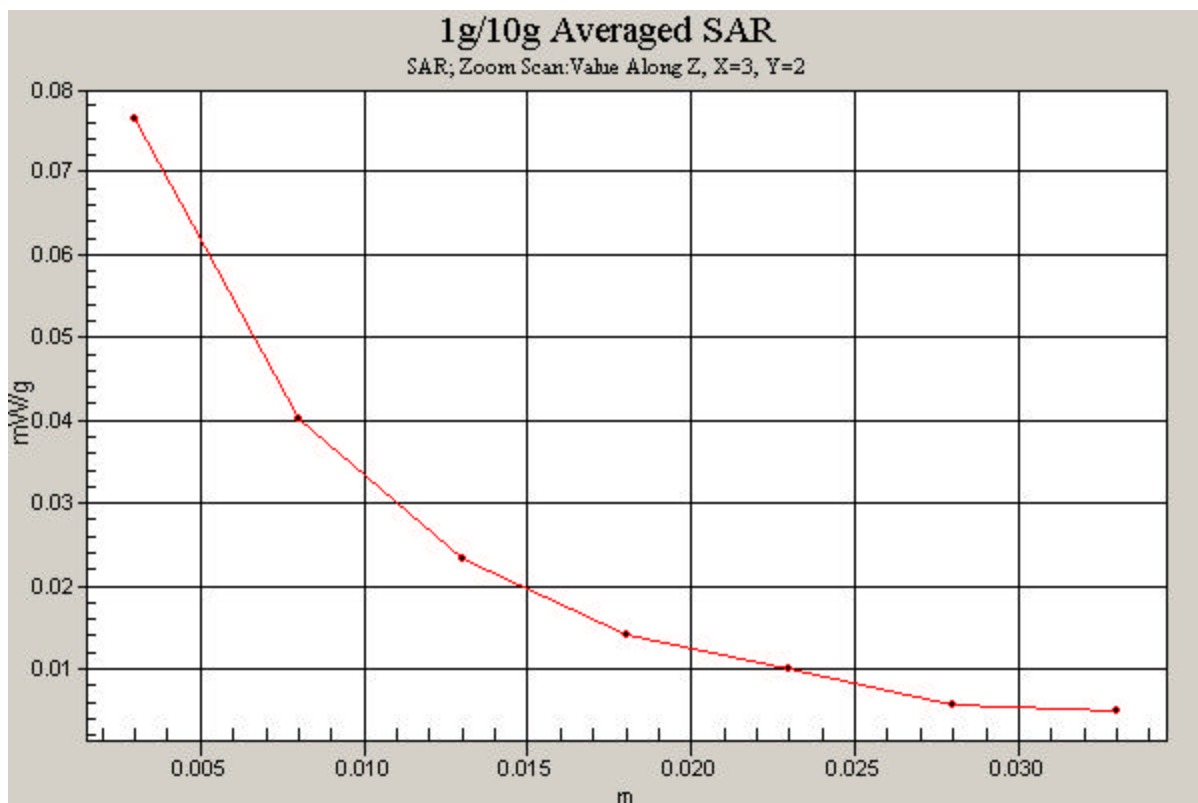
**Area Scan (7x20x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.86 V/m

Peak SAR (extrapolated) = 0.119 W/kg

**SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.033 mW/g**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SCH-i730; Type: Samsung Dual Band Cellular Phone with WLAN and Bluetooth; Serial: #3**

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Muscle ( $\sigma = 1.93$  mho/m,  $\epsilon_r = 52.92$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Flat Section; Space: 1.5 cm; Tested with Beltclip

Test Date: 10-02-2004; Ambient Temp: 23.7°C; Tissue Temp: 22.3°C

Probe: ES3DV2 - SN3022; ConvF(4.2, 4.2, 4.2); Calibrated: 9/24/2004

Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## Ch.11, Slide In, Ant Out, Extended Battery

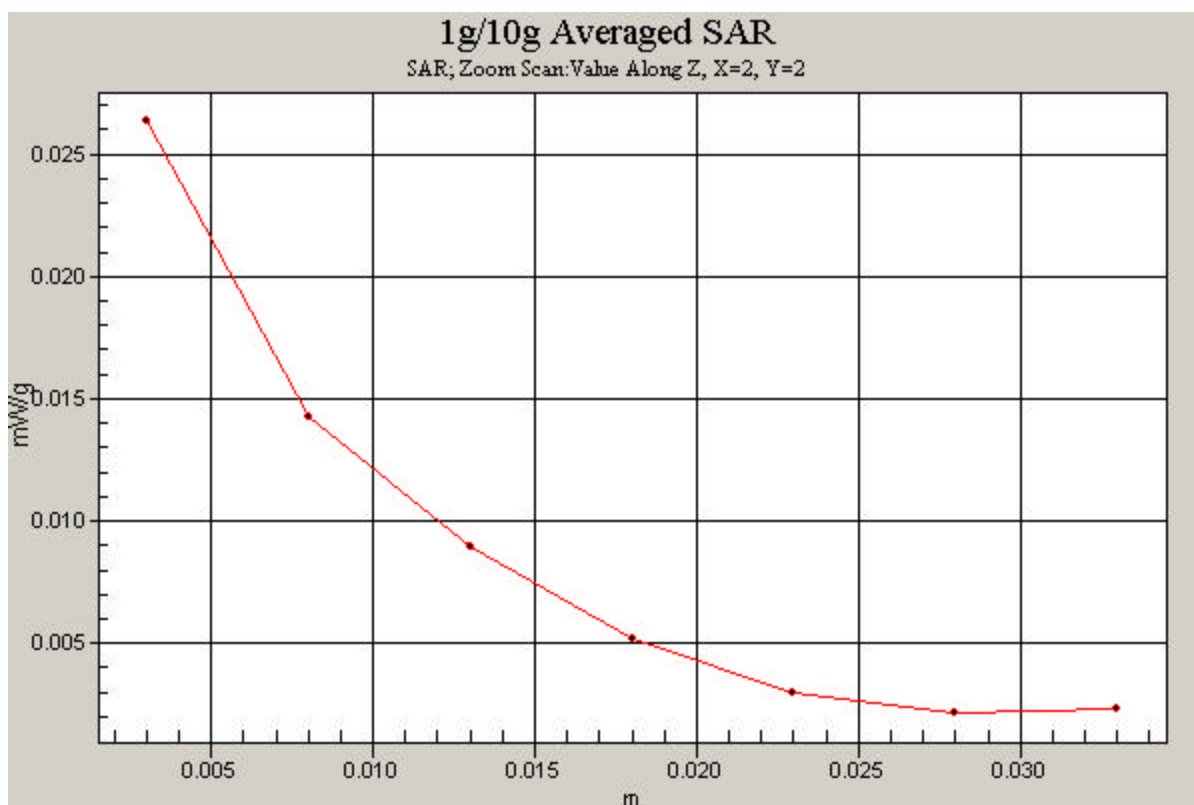
**Area Scan (7x16x1):** Measurement grid: dx=15mm, dy=15mm

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.92 V/m

Peak SAR (extrapolated) = 0.040 W/kg

**SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.013 mW/g**



## **APPENDIX G: WLAN & BT DIPOLE VALIDATION**

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:719**

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-01-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.7°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## 2450 MHz Dipole Validation

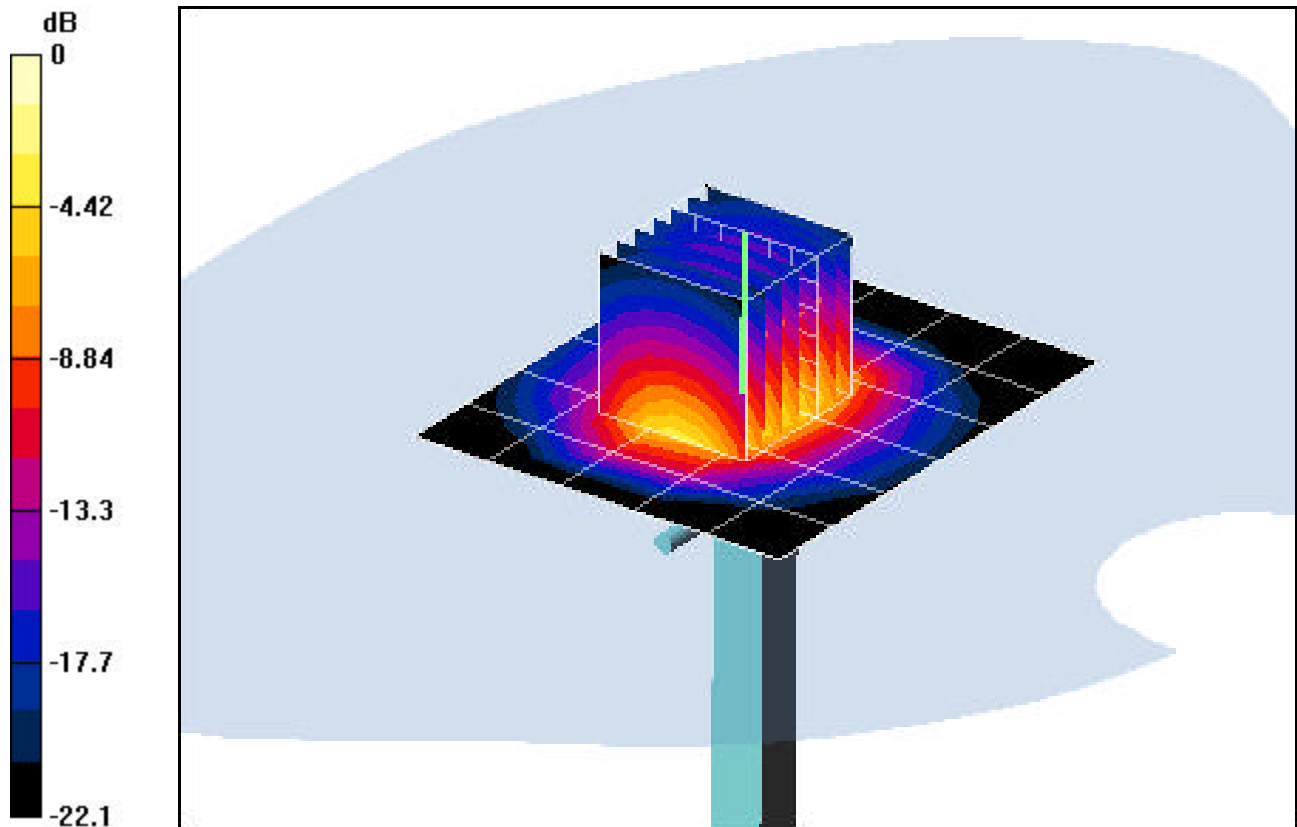
**Area Scan (6x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 24.0 dBm (250 mW)

**SAR(1 g) = 12.9 mW/g; SAR(10 g) = 5.92 mW/g**

Target SAR(1g) = 13.1 mW/g; Deviation = -1.52 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:719**

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Brain ( $\sigma = 1.88$  mho/m,  $\epsilon_r = 41.09$ ,  $\rho = 1000$  kg/m<sup>3</sup>)

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-02-2004; Ambient Temp: 23.5°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/24/2004

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE3 Sn330; Calibrated: 6/23/2004

Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197

Measurement SW: DASY4, V4.3 Build 16; Postprocessing SW: SEMCAD, V1.8 Build 123

## 2450 MHz Dipole Validation

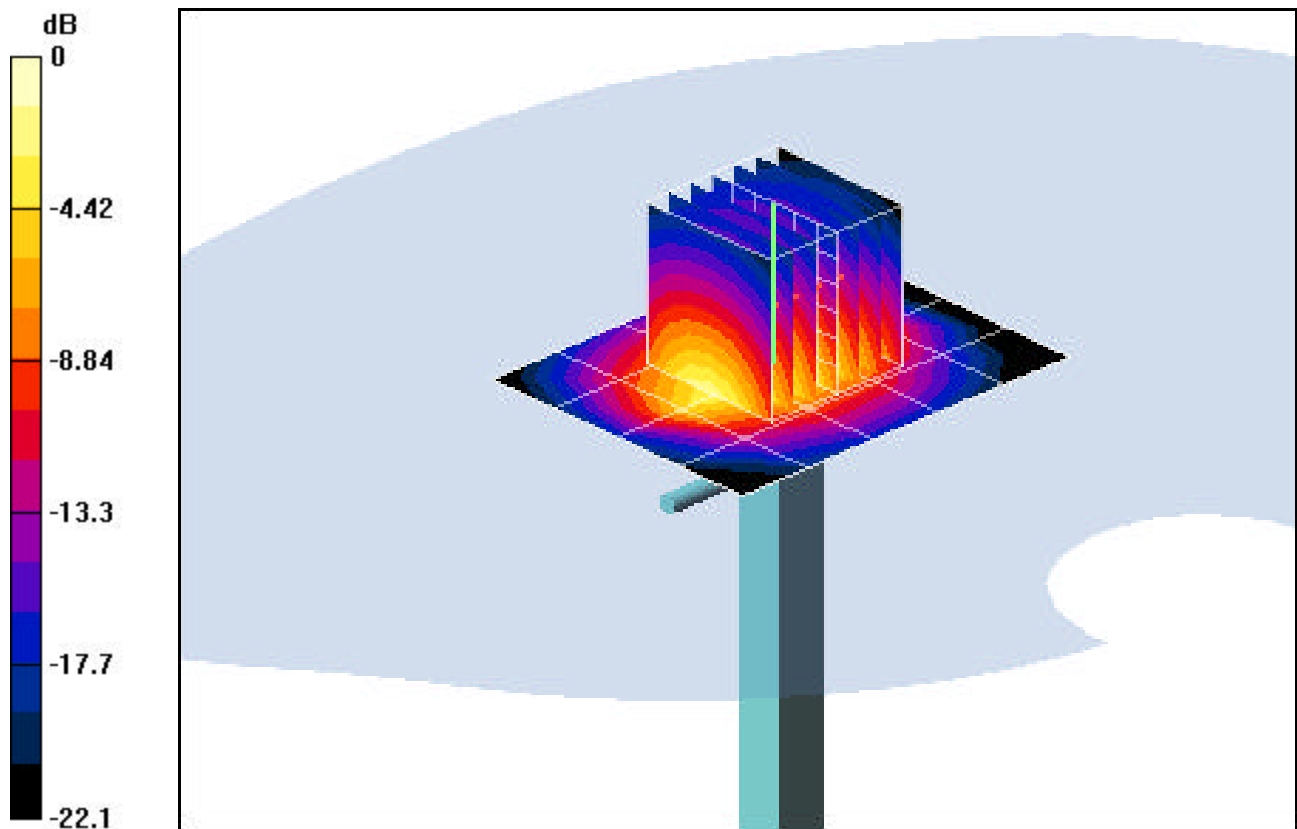
**Area Scan (5x6x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 24.0 dBm (250 mW)

**SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.11 mW/g**

Target SAR(1g) = 13.1 mW/g; Deviation = -0.76 %



0 dB = 17.4mW/g

## **APPENDIX H: PROBE CALIBRATION**

Client

PC Test

## CALIBRATION CERTIFICATE

Object(s)

ES3DV2 - SN 3022

Calibration procedure(s)

QA CAL-01 v2  
Calibration procedure for dosimetric E-field probes

Calibration date:

September 23, 2003

Condition of the calibrated item

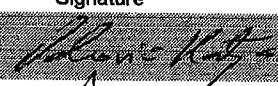

In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Reference 20 dB Attenuator	SN: 5086 (20b)	3-Apr-03 (METAS No. 251-0340)	Apr-04
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	In house check: Oct 03
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Laboratory Director	
Approved by:	Niels Kuster	Quality Manager	

Date issued: October 5, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.



# Probe ES3DV2

SN:3022

Manufactured:	April 15, 2003
Last calibration:	September 23, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

# DASY - Parameters of Probe: ES3DV2 SN:3022

## Sensitivity in Free Space

## Diode Compression

NormX	<b>1.00</b> $\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	<b>95</b>	mV
NormY	<b>1.04</b> $\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	<b>95</b>	mV
NormZ	<b>0.98</b> $\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	<b>95</b>	mV

## Sensitivity in Tissue Simulating Liquid

Head                      900 MHz                       $\epsilon_r = 41.5 \pm 5\%$                        $\sigma = 0.97 \pm 5\%$  mho/m  
Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	<b>6.1</b> $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	<b>6.1</b> $\pm 9.5\%$ (k=2)	Alpha	<b>0.32</b>
ConvF Z	<b>6.1</b> $\pm 9.5\%$ (k=2)	Depth	<b>1.65</b>

Head                      1800 MHz                       $\epsilon_r = 40.0 \pm 5\%$                        $\sigma = 1.40 \pm 5\%$  mho/m  
Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	<b>5.0</b> $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	<b>5.0</b> $\pm 9.5\%$ (k=2)	Alpha	<b>0.25</b>
ConvF Z	<b>5.0</b> $\pm 9.5\%$ (k=2)	Depth	<b>2.30</b>

## Boundary Effect

Head                      900 MHz                      Typical SAR gradient: 5 % per mm

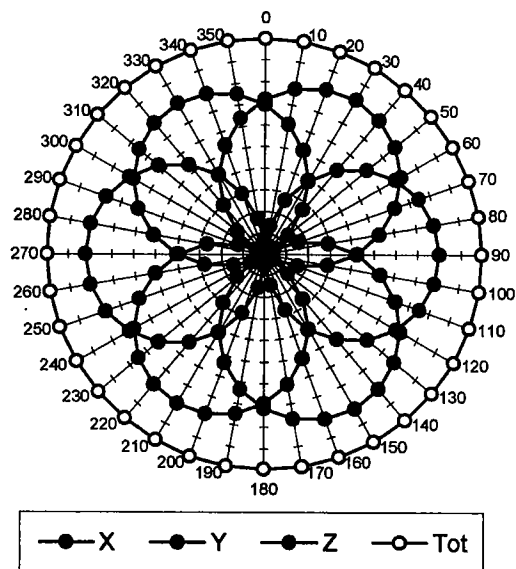
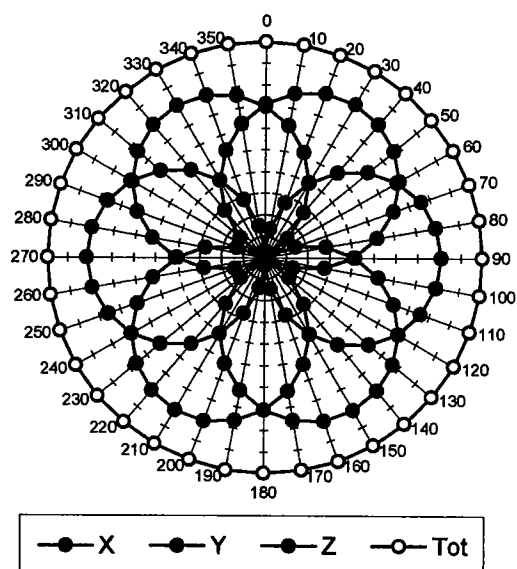
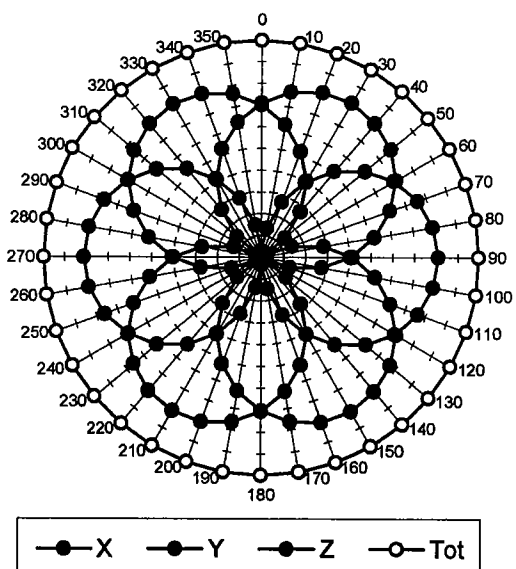
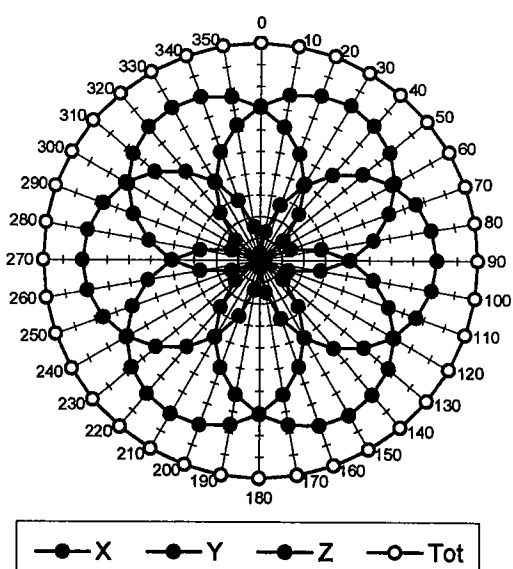
Probe Tip to Boundary		<b>1 mm</b>	<b>2 mm</b>
SAR <sub>be</sub> [%] Without Correction Algorithm		5.5	2.5
SAR <sub>be</sub> [%] With Correction Algorithm		0.1	0.4

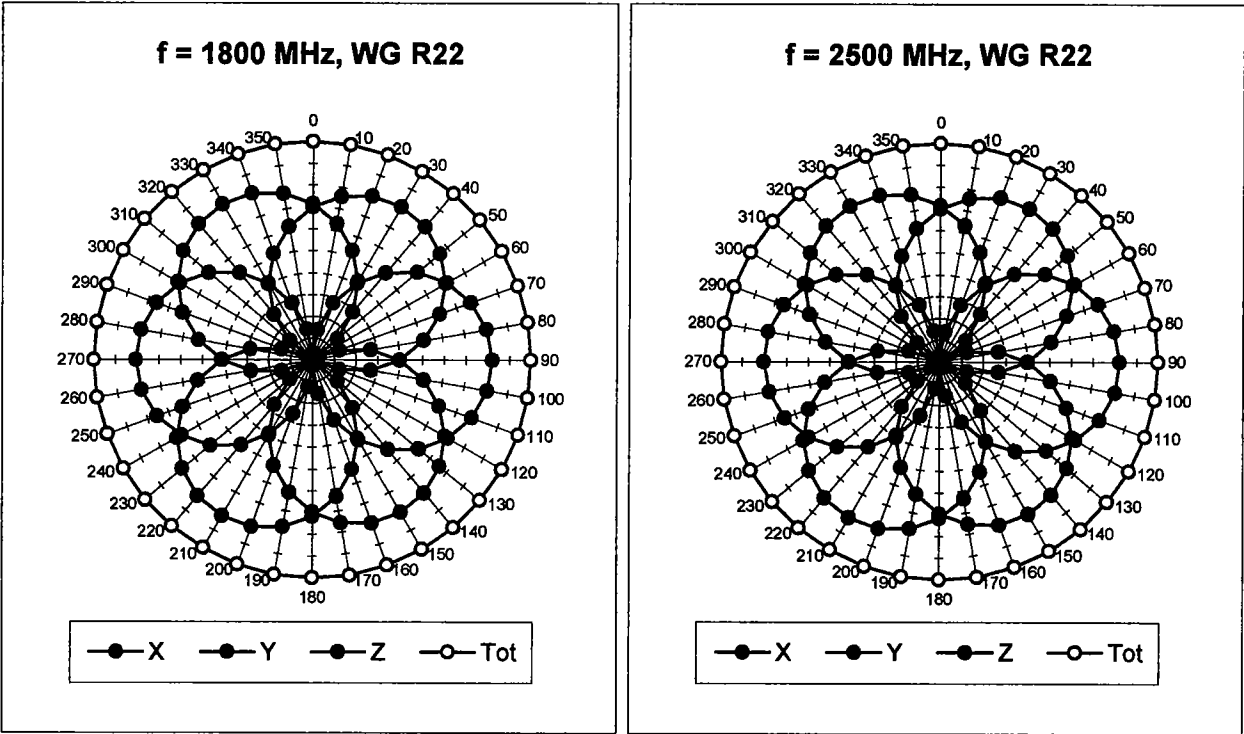
Head                      1800 MHz                      Typical SAR gradient: 10 % per mm

Probe Tip to Boundary		<b>1 mm</b>	<b>2 mm</b>
SAR <sub>be</sub> [%] Without Correction Algorithm		7.1	4.4
SAR <sub>be</sub> [%] With Correction Algorithm		0.0	0.1

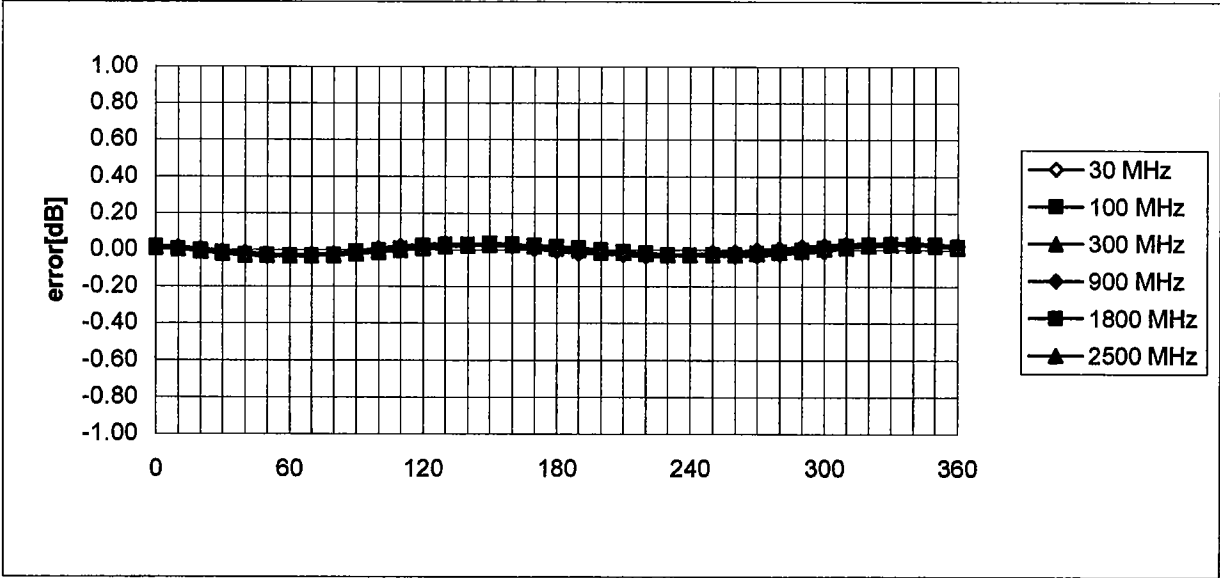
## Sensor Offset

Probe Tip to Sensor Center	<b>2.0</b>	mm
----------------------------	------------	----

Receiving Pattern ( $\phi$ ,  $\theta = 0^\circ$ )**f = 30 MHz, TEM cell ifi110****f = 100 MHz, TEM cell ifi110****f = 300 MHz, TEM cell ifi110****f = 900 MHz, TEM cell ifi110**

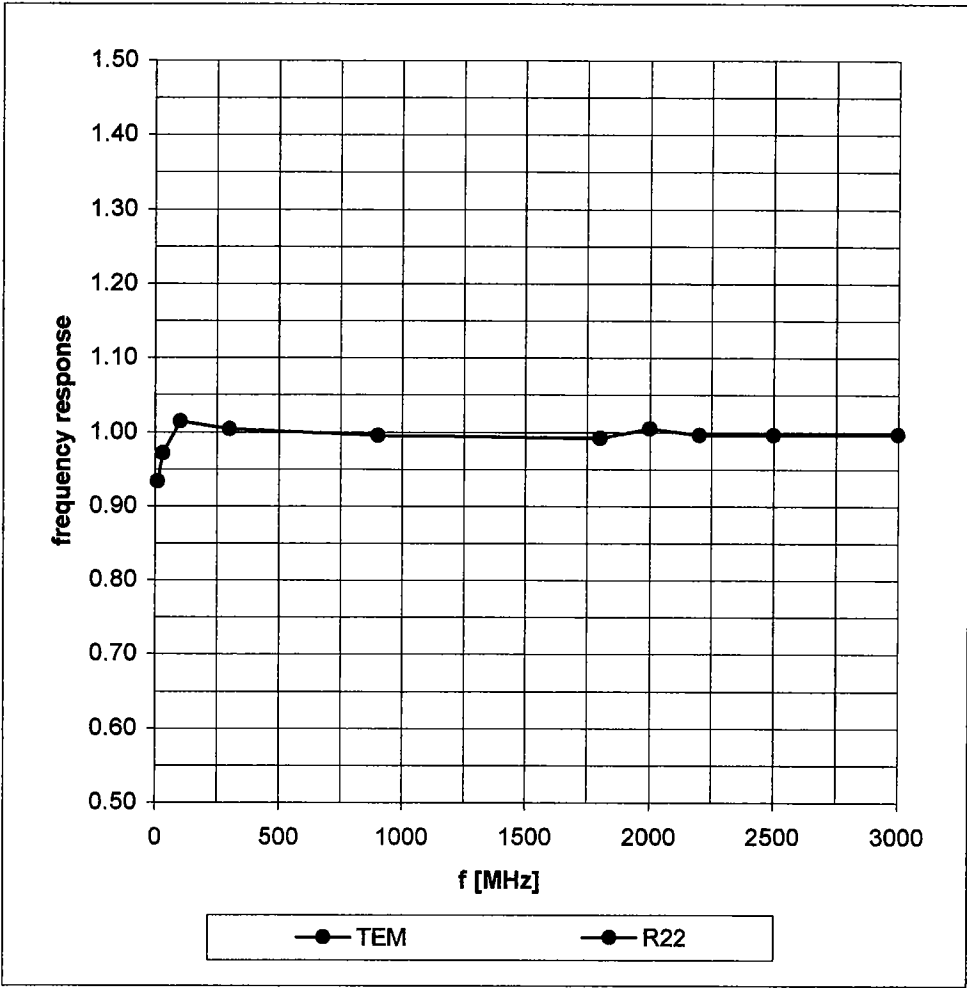


**Isotropy Error ( $\phi$ ),  $\theta = 0^\circ$**

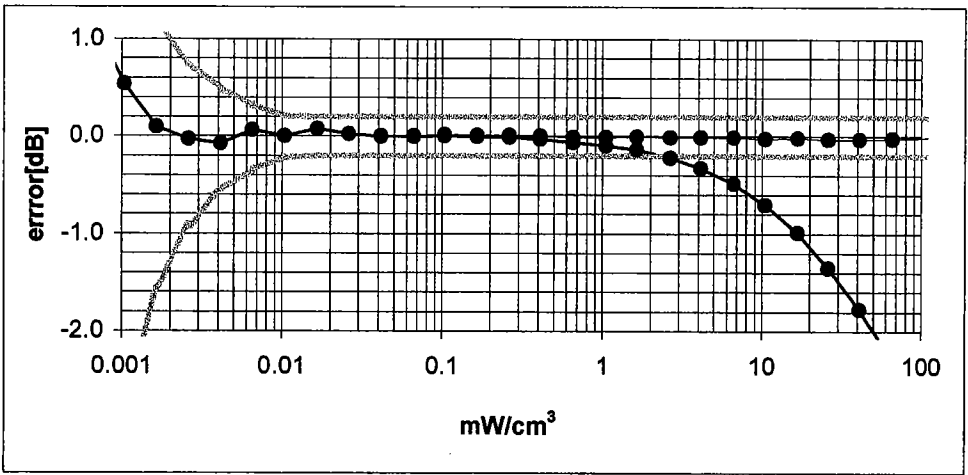
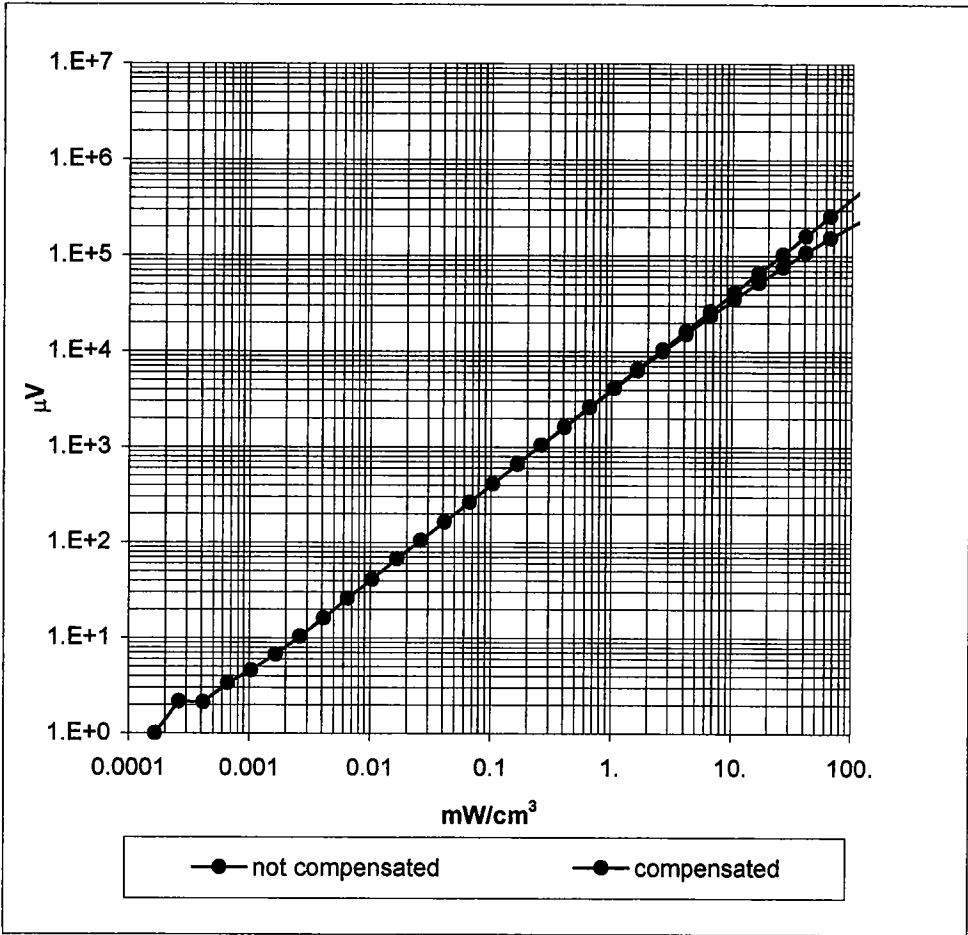


# Frequency Response of E-Field

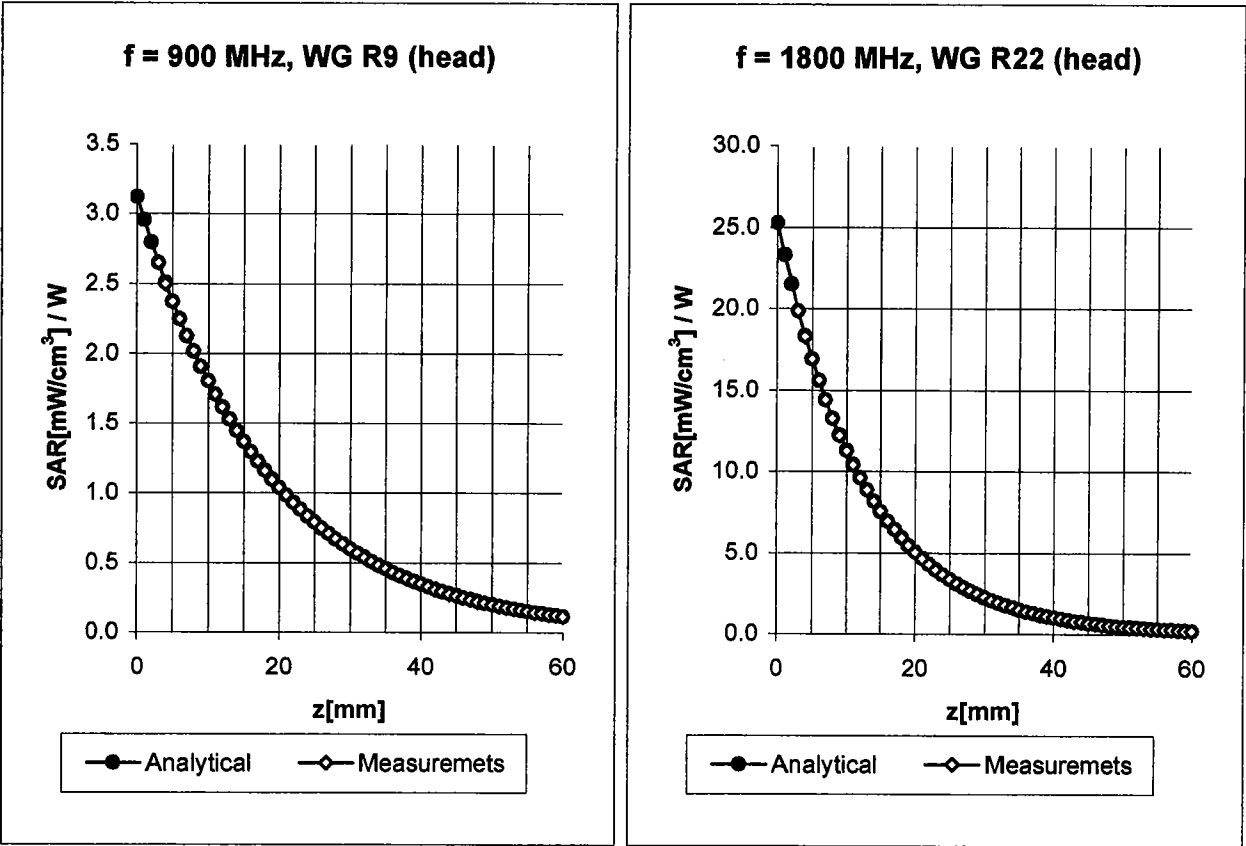
( TEM-Cell:ifi110, Waveguide R22)



Dynamic Range  $f(\text{SAR}_{\text{brain}})$   
( Waveguide R22 )



Conversion Factor Assessment



**Head                      900 MHz                       $\epsilon_r = 41.5 \pm 5\%$                        $\sigma = 0.97 \pm 5\%$  mho/m**

**Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X**

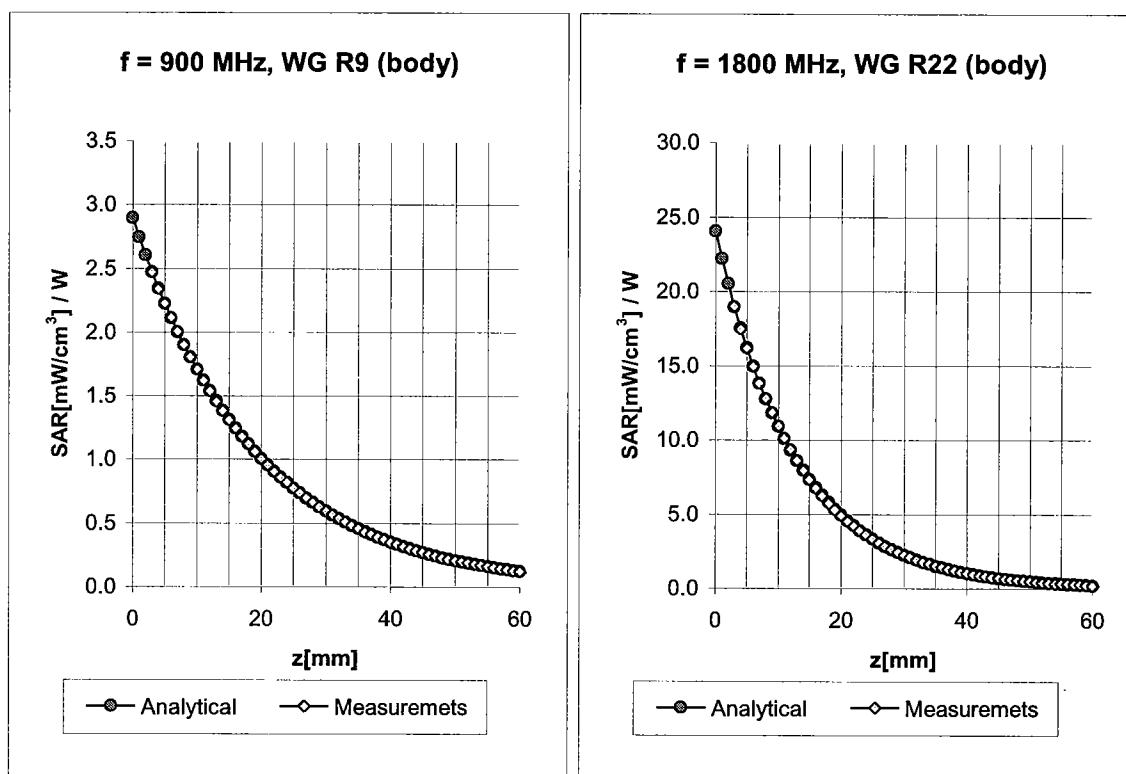
ConvF X	<b>6.1 <math>\pm 9.5\%</math> (k=2)</b>	Boundary effect:	
ConvF Y	<b>6.1 <math>\pm 9.5\%</math> (k=2)</b>	Alpha	<b>0.32</b>
ConvF Z	<b>6.1 <math>\pm 9.5\%</math> (k=2)</b>	Depth	<b>1.65</b>

**Head                      1800 MHz                       $\epsilon_r = 40.0 \pm 5\%$                        $\sigma = 1.40 \pm 5\%$  mho/m**

**Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X**

ConvF X	<b>5.0 <math>\pm 9.5\%</math> (k=2)</b>	Boundary effect:	
ConvF Y	<b>5.0 <math>\pm 9.5\%</math> (k=2)</b>	Alpha	<b>0.25</b>
ConvF Z	<b>5.0 <math>\pm 9.5\%</math> (k=2)</b>	Depth	<b>2.30</b>

## Conversion Factor Assessment



**Body**                      **900 MHz**                       $\epsilon_r = 55.0 \pm 5\%$                        $\sigma = 1.05 \pm 5\% \text{ mho/m}$

Valid for f=800-1000 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	<b>6.0</b> $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	<b>6.0</b> $\pm 9.5\%$ (k=2)	Alpha	<b>0.38</b>
ConvF Z	<b>6.0</b> $\pm 9.5\%$ (k=2)	Depth	<b>1.47</b>

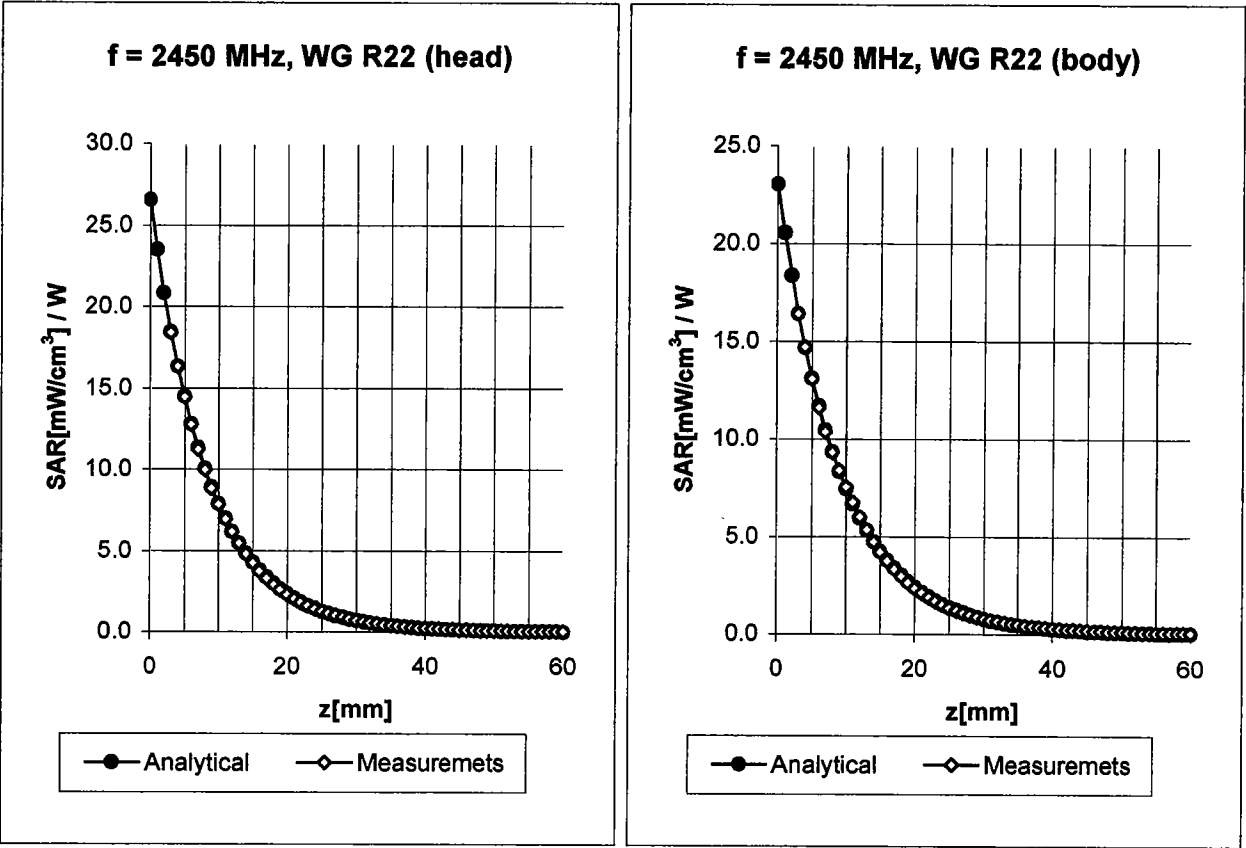
**Body**                      **1800 MHz**                       $\epsilon_r = 53.3 \pm 5\%$                        $\sigma = 1.52 \pm 5\% \text{ mho/m}$

Valid for f=1710-1910 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	<b>4.5</b> $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	<b>4.5</b> $\pm 9.5\%$ (k=2)	Alpha	<b>0.22</b>
ConvF Z	<b>4.5</b> $\pm 9.5\%$ (k=2)	Depth	<b>3.42</b>



Conversion Factor Assessment



**Head                      2450 MHz                       $\epsilon_r = 39.2 \pm 5\%$                        $\sigma = 1.80 \pm 5\%$  mho/m**

**Valid for f=2400-2500 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X**

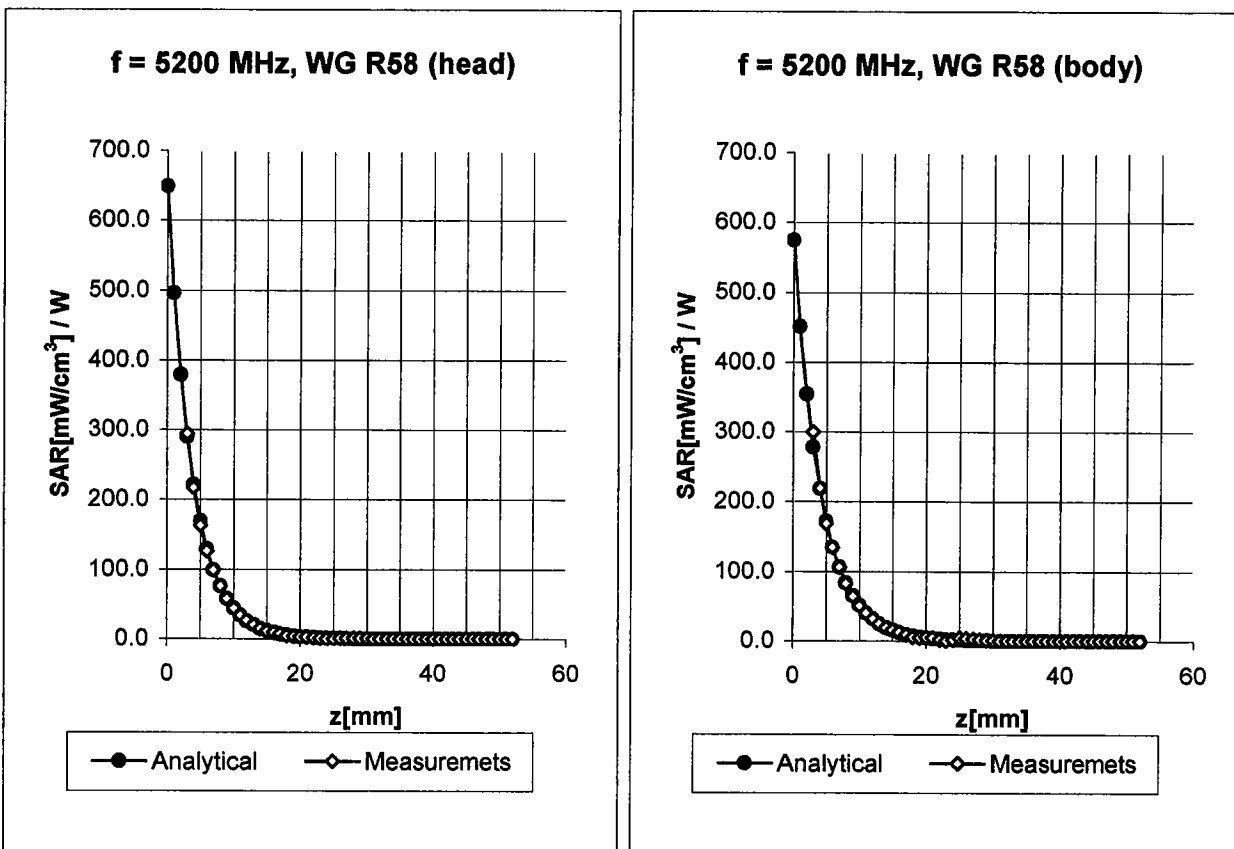
ConvF X	<b>4.5</b> $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	<b>4.5</b> $\pm 9.5\%$ (k=2)	Alpha <b>0.42</b>
ConvF Z	<b>4.5</b> $\pm 9.5\%$ (k=2)	Depth <b>1.56</b>

**Body                      2450 MHz                       $\epsilon_r = 52.7 \pm 5\%$                        $\sigma = 1.95 \pm 5\%$  mho/m**

**Valid for f=2400-2500 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C**

ConvF X	<b>4.2</b> $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	<b>4.2</b> $\pm 9.5\%$ (k=2)	Alpha <b>0.42</b>
ConvF Z	<b>4.2</b> $\pm 9.5\%$ (k=2)	Depth <b>1.65</b>

## Conversion Factor Assessment



**Head**                      **5200 MHz**                       $\epsilon_r = 36.0 \pm 5\%$                        $\sigma = 4.66 \pm 5\% \text{ mho/m}$

Valid for f=4940-5460 MHz with Head Tissue Simulating Liquid according to OET65-SuppC

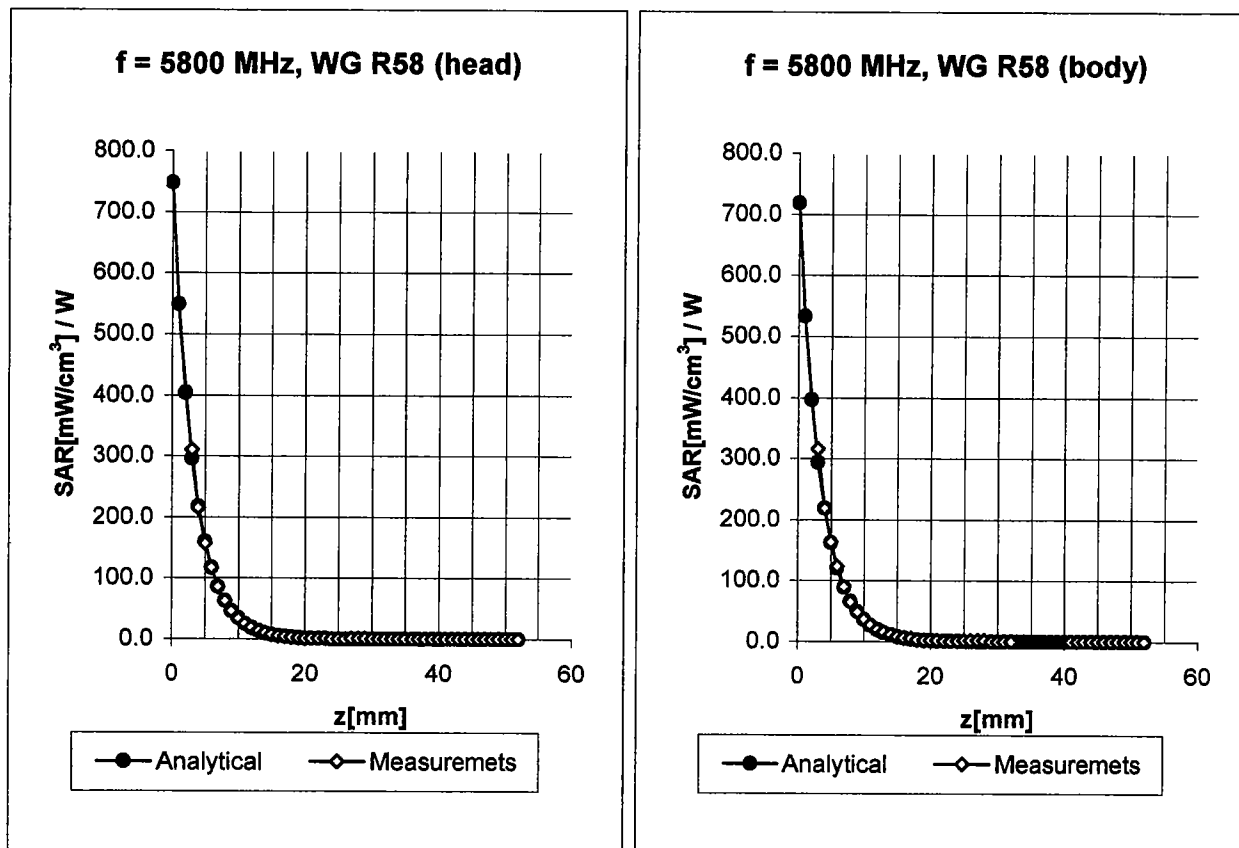
ConvF X	<b>2.60</b> $\pm 16.6\%$ (k=2)	Boundary effect:	
ConvF Y	<b>2.60</b> $\pm 16.6\%$ (k=2)	Alpha	<b>0.93</b>
ConvF Z	<b>2.60</b> $\pm 16.6\%$ (k=2)	Depth	<b>1.50</b>

**Body**                      **5200 MHz**                       $\epsilon_r = 49.0 \pm 5\%$                        $\sigma = 5.30 \pm 5\% \text{ mho/m}$

Valid for f=4940-5460 MHz with Body Tissue Simulating Liquid according to OET65-SuppC

ConvF X	<b>1.80</b> $\pm 16.6\%$ (k=2)	Boundary effect:	
ConvF Y	<b>1.80</b> $\pm 16.6\%$ (k=2)	Alpha	<b>1.05</b>
ConvF Z	<b>1.80</b> $\pm 16.6\%$ (k=2)	Depth	<b>1.60</b>

## Conversion Factor Assessment



**Head**                      **5800 MHz**                       $\epsilon_r = 35.3 \pm 5\%$                        $\sigma = 5.27 \pm 5\% \text{ mho/m}$

Valid for f=5510-6090 MHz with Head Tissue Simulating Liquid according to OET65-SuppC

ConvF X	<b>2.15</b> $\pm 16.6\%$ (k=2)	Boundary effect:	
ConvF Y	<b>2.15</b> $\pm 16.6\%$ (k=2)	Alpha	<b>1.04</b>
ConvF Z	<b>2.15</b> $\pm 16.6\%$ (k=2)	Depth	<b>1.50</b>

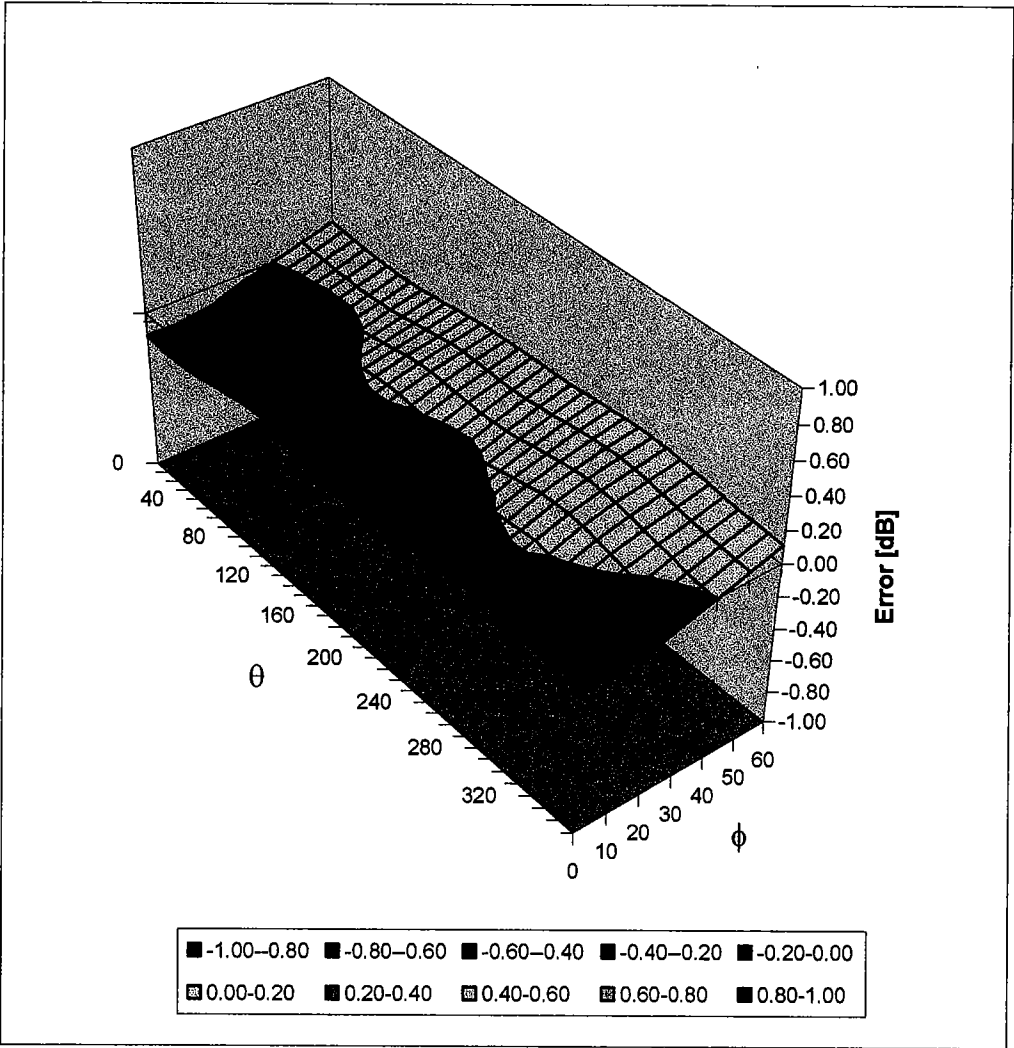
**Body**                      **5800 MHz**                       $\epsilon_r = 48.2 \pm 5\%$                        $\sigma = 6.0 \pm 5\% \text{ mho/m}$

Valid for f=5510-6090 MHz with Body Tissue Simulating Liquid according to OET65-SuppC

ConvF X	<b>1.57</b> $\pm 16.6\%$ (k=2)	Boundary effect:	
ConvF Y	<b>1.57</b> $\pm 16.6\%$ (k=2)	Alpha	<b>1.15</b>
ConvF Z	<b>1.57</b> $\pm 16.6\%$ (k=2)	Depth	<b>1.70</b>

# Deviation from Isotropy in HSL

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



## **Additional Conversion Factors**

**for Dosimetric E-Field Probe**

Type:

**ES3DV2**

Serial Number:

**3022**

Place of Assessment:

**Zurich**

Date of Assessment:

**December 3, 2003**

Probe Calibration Date:

**September 23, 2003**

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 ES3DV2 SN:3022

Conversion factor ( $\pm$  standard deviation)

**1950 MHz**                      ConvF                       **$4.7 \pm 9.5\%$**

$\epsilon = 40.0 \pm 5\%$   
 $\sigma = 1.40 \pm 5\% \text{ mho/m}$   
(head tissue)

**1950 MHz**                      ConvF                       **$4.3 \pm 9.5\%$**

$\epsilon = 53.3 \pm 5\%$   
 $\sigma = 1.52 \pm 5\% \text{ mho/m}$   
(body tissue)

## **Additional Conversion Factors**

**for Dosimetric E-Field Probe**

Type:

**ES3DV2**

Serial Number:

**3022**

Place of Assessment:

**Zurich**

Date of Assessment:

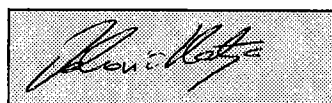
**October 3, 2003**

Probe Calibration Date:

**September 23, 2003**

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 ES3DV2 SN:3022

Conversion factor ( $\pm$  standard deviation)

150 MHz	ConvF	$8.5 \pm 8\%$	$\epsilon_r = 52.3 \pm 5\%$ $\sigma = 0.76 \pm 5\% \text{ mho/m}$ (head tissue)
150 MHz	ConvF	$8.0 \pm 8\%$	$\epsilon_r = 61.9 \pm 5\%$ $\sigma = 0.80 \pm 5\% \text{ mho/m}$ (body tissue)
450 MHz	ConvF	$7.1 \pm 8\%$	$\epsilon_r = 43.5 \pm 5\%$ $\sigma = 0.87 \pm 5\% \text{ mho/m}$ (head tissue)
450 MHz	ConvF	$7.2 \pm 8\%$	$\epsilon_r = 56.7 \pm 5\%$ $\sigma = 0.94 \pm 5\% \text{ mho/m}$ (body tissue)



## **Additional Conversion Factors**

**for Dosimetric E-Field Probe**

Type:

**ES3DV2**

Serial Number:

**3022**

Place of Assessment:

**Zurich**

Date of Assessment:

**November 28, 2003**

Probe Calibration Date:

**September 23, 2003**

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 ES3DV2 SN:3022

Conversion factor ( $\pm$  standard deviation)

1600 MHz	ConvF	5.2 $\pm$ 8%	$\epsilon = 40.3 \pm 5\%$ $\sigma = 1.29 \pm 5\%$ mho/m (head tissue)
1600 MHz	ConvF	4.9 $\pm$ 8%	$\epsilon = 53.8 \pm 5\%$ $\sigma = 1.40 \pm 5\%$ mho/m (body tissue)

## **Additional Conversion Factors**

**for Dosimetric E-Field Probe**

Type:

**ES3DV2**

Serial Number:

**3022**

Place of Assessment:

**Zurich**

Date of Assessment:

**December 9, 2003**

Probe Calibration Date:

**September 23, 2003**

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 ES3DV2 SN:3022**

Conversion factor ( $\pm$  standard deviation)

**2140 MHz**                      ConvF                       **$4.5 \pm 8\%$**

$\epsilon = 39.8 \pm 5\%$ $\sigma = 1.49 \pm 5\% \text{ mho/m}$ (brain tissue)
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