Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

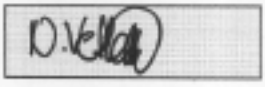
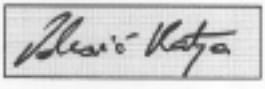
Calibration Certificate

Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1733**
Place of Calibration:	**Zurich**
Date of Calibration:	**December 3, 2002**
Calibration Interval:	**12 months**

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:	
Approved by:	

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info@speag.com, http://www.speag.com

s p e a g

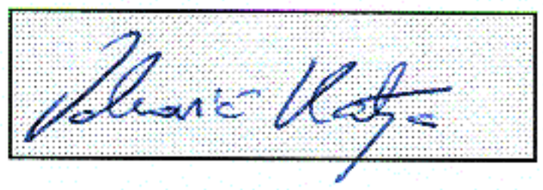
Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1733**
Place of Assessment:	**Zurich**
Date of Assessment:	**January 23, 2003**
Probe Calibration Date:	**December 3, 2002**

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:



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Dosimetric E-Field Probe ET3DV6 SN:1733

Conversion factor (± standard deviation)

835 MHz	ConvF	**6.4 ± 8%**	**ε_r = 55.2 ± 5%** **σ = 0.97 ± 5% mho/m** (body tissue)
900 MHz	ConvF	**6.3 ± 8%**	**ε_r = 55.0 ± 5%** **σ = 1.05 ± 5% mho/m** (body tissue)
1800 MHz	ConvF	**5.0 ± 8%**	**ε_r = 53.3 ± 5%** **σ = 1.52 ± 5% mho/m** (body tissue)
1900 MHz	ConvF	**4.8 ± 8%**	**ε_r = 53.3 ± 5%** **σ = 1.52 ± 5% mho/m** (body tissue)
1950 MHz	ConvF	**5.1 ± 8%**	**ε_r = 40.0 ± 5%** **σ = 1.40 ± 5% mho/m** (head tissue)
1950 MHz	ConvF	**4.7 ± 8%**	**ε_r = 53.3 ± 5%** **σ = 1.52 ± 5% mho/m** (body tissue)

Schmid & Partner
Engineering AG

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X11202
Due for CAL
John G.

Probe ET3DV6

SN:1733

Manufactured: September 27, 2002
Last calibration: December 3, 2002

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1733

Sensitivity in Free Space

NormX	**1.50**	$\mu V/(V/m)^2$	DCP X	**93**	mV
NormY	**1.46**	$\mu V/(V/m)^2$	DCP Y	**93**	mV
NormZ	**1.44**	$\mu V/(V/m)^2$	DCP Z	**93**	mV

Sensitivity in Tissue Simulating Liquid

Head	**900 MHz**	ε_r = **41.5 ± 5%**	σ = **0.97 ± 5% mho/m**	
Head	**835 MHz**	ε_r = **41.5 ± 5%**	σ = **0.90 ± 5% mho/m**	
	ConvF X	**6.5** ± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**6.5** ± 9.5% (k=2)	Alpha	**0.35**
	ConvF Z	**6.5** ± 9.5% (k=2)	Depth	**2.57**
Head	**1800 MHz**	ε_r = **40.0 ± 5%**	σ = **1.40 ± 5% mho/m**	
Head	**1900 MHz**	ε_r = **40.0 ± 5%**	σ = **1.40 ± 5% mho/m**	
	ConvF X	**5.4** ± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**5.4** ± 9.5% (k=2)	Alpha	**0.47**
	ConvF Z	**5.4** ± 9.5% (k=2)	Depth	**2.44**

Boundary Effect

Head **900 MHz** **Typical SAR gradient: 5 % per mm**

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	9.4	5.4
SAR_{be} [%]	With Correction Algorithm	0.3	0.5

Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

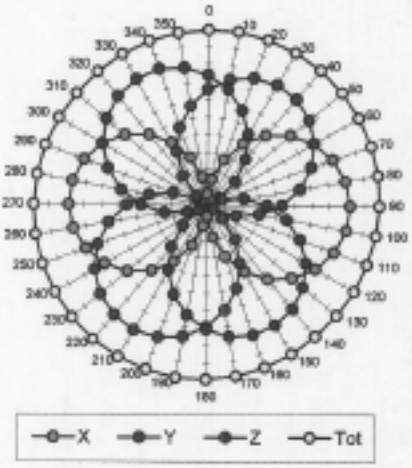
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	11.3	7.6
SAR_{be} [%]	With Correction Algorithm	0.2	0.2

Sensor Offset

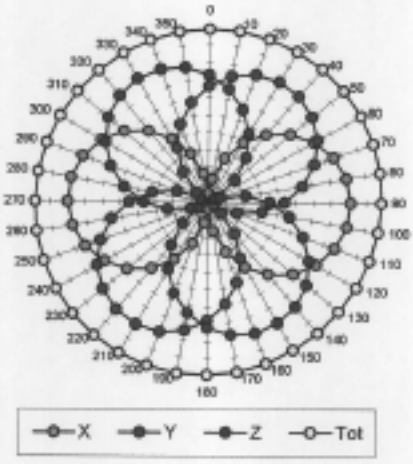
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.6 ± 0.2**	mm

Receiving Pattern (ϕ), θ = 0°

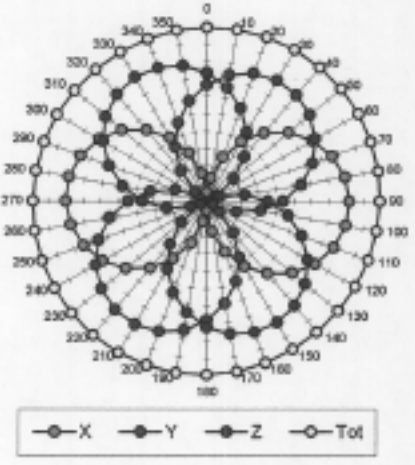
f = 30 MHz, TEM cell ifi110



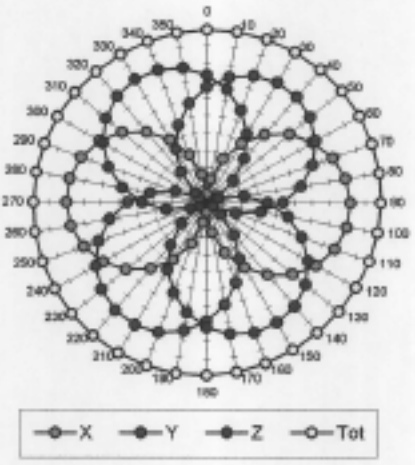
f = 100 MHz, TEM cell ifi110

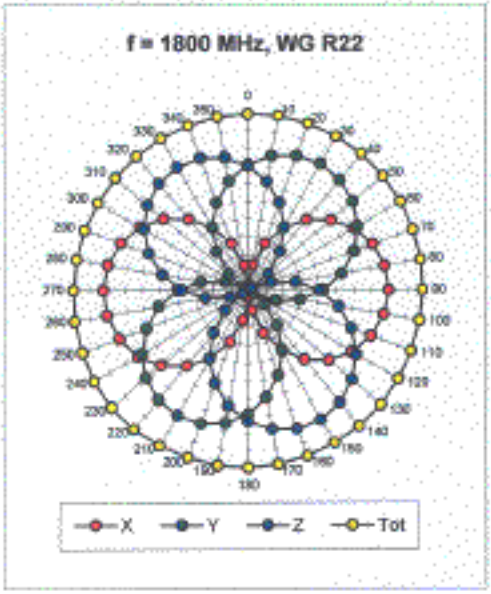


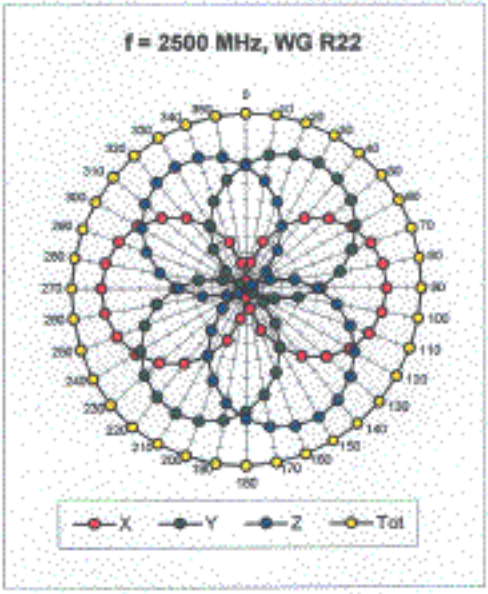
f = 300 MHz, TEM cell ifi110



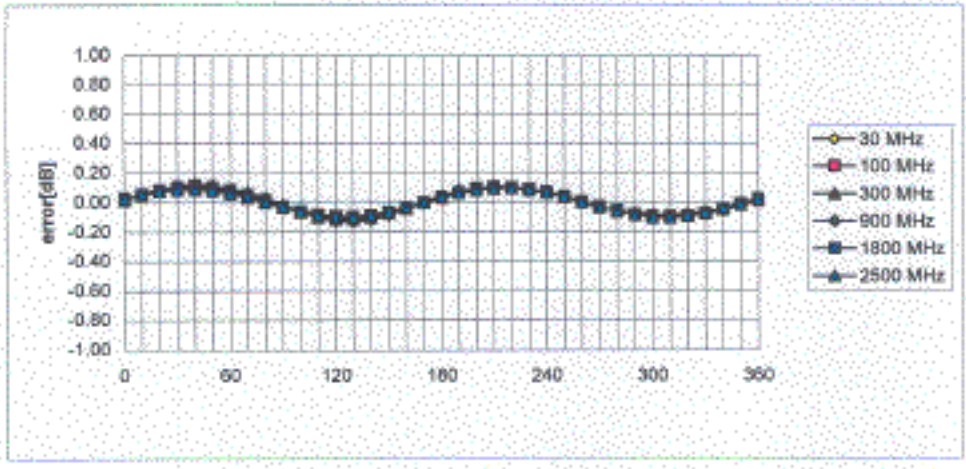
f = 900 MHz, TEM cell ifi110





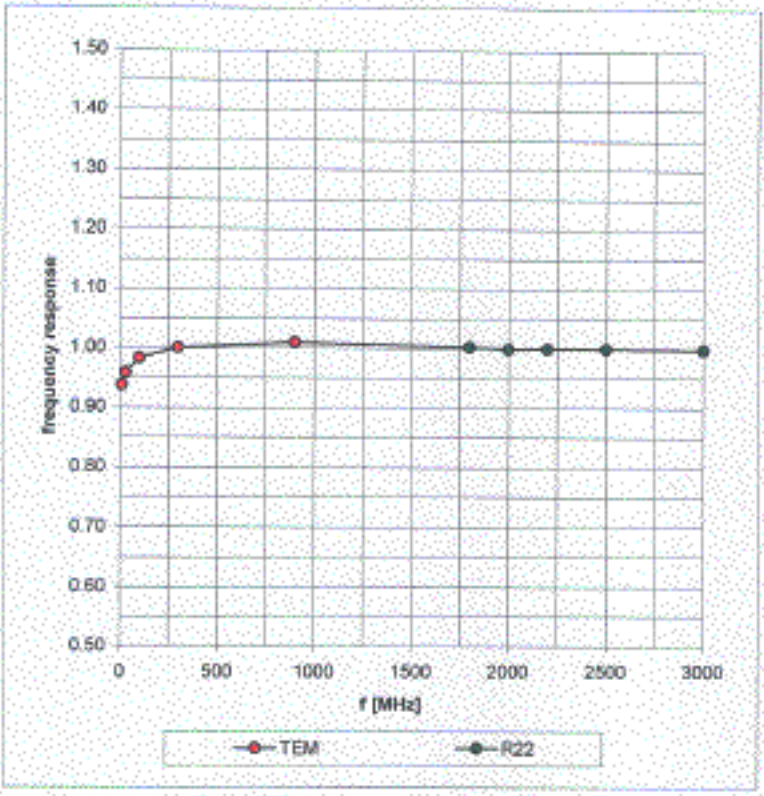


Isotropy Error (ϕ), θ = 0°



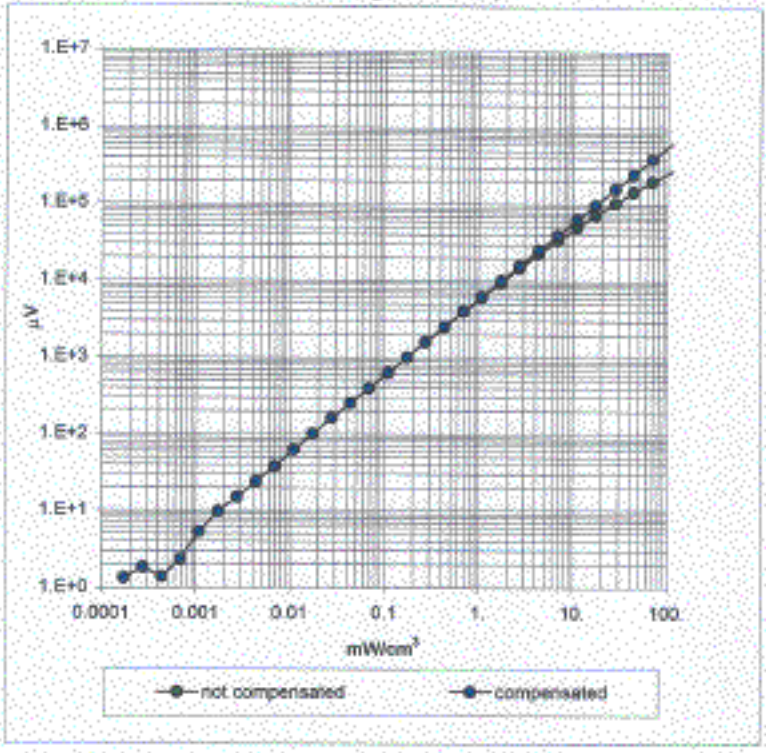
Frequency Response of E-Field

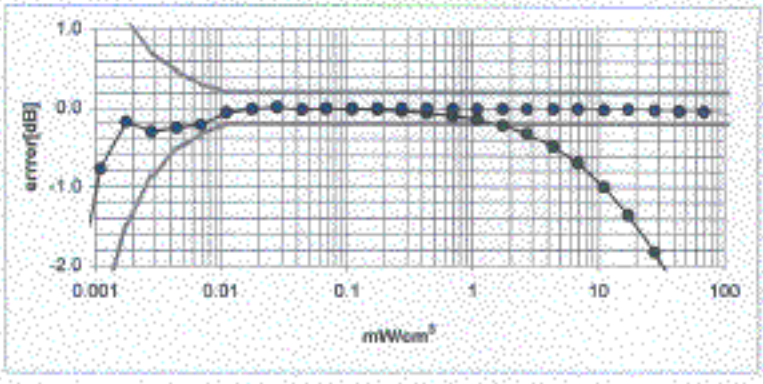
(TEM-Cell:ifi110, Waveguide R22)



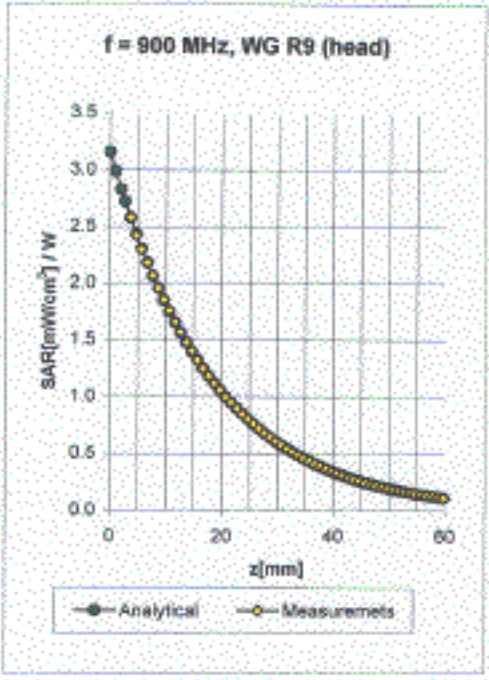
Dynamic Range f(SAR_{brain})

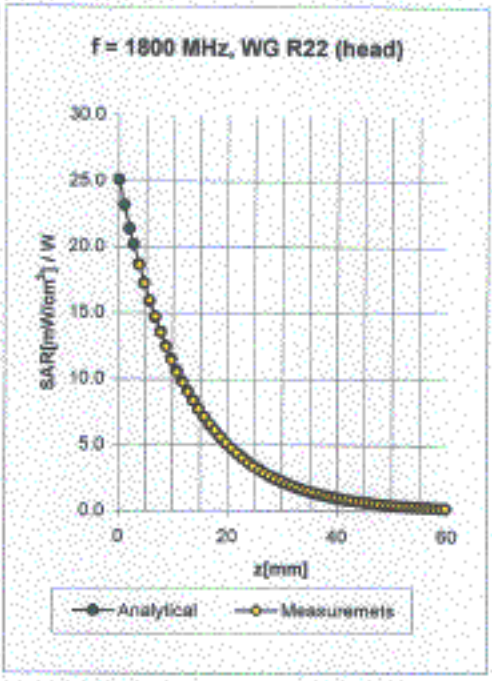
(Waveguide R22)





Conversion Factor Assessment



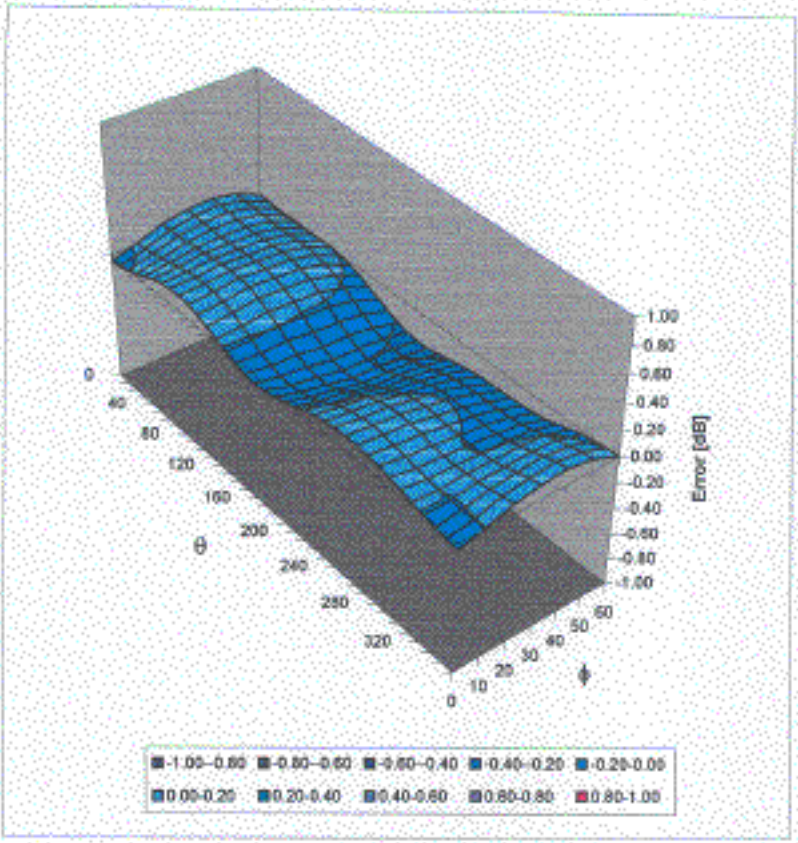


Head	**900 MHz**		ε_r = 41.5 ± 5%	σ = 0.97 ± 5% mho/m	
Head	**835 MHz**		ε_r = 41.5 ± 5%	σ = 0.90 ± 5% mho/m	
	ConvF X	**6.5** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**6.5** ± 9.5% (k=2)		Alpha	**0.35**
	ConvF Z	**6.5** ± 9.5% (k=2)		Depth	**2.57**

Head	**1800 MHz**		ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m	
Head	**1900 MHz**		ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m	
	ConvF X	**5.4** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**5.4** ± 9.5% (k=2)		Alpha	**0.47**
	ConvF Z	**5.4** ± 9.5% (k=2)		Depth	**2.44**

Deviation from Isotropy in HSL

Error (θ,φ), f = 900 MHz



Appendix A. Leather Holster Accessory (Dec. 2004)

A.1 General

This section documents additional SAR testing on Qsec-2700 that was performed as the result of two new leather holster accessories that have different dimensions than the original clip described in Section 2 of this report, and also contains some metal parts. The testing for this accessory involved only flat phantom testing as described in Section A.3. Both holsters have identical clip designs and dimensions, and therefore only one holster, QUALCOMM part number 700-47205-0001, was tested as representative of both models. The second holster, QUALCOMM part number 700-47205-002, has an additional leather flap to cover the front of the phone. Photos of both models are shown in Section A.2.

A.2 Photos of Leather Holster

Figure A-1 Three-quarter view of leather holster MCN (part number) 700-47205-0001

Figure A-2 Front view of leather holster, MCN (part number) 700-47204-0001

Figure A-3 Three-quarter view of leather holster MCN (part number) 700-47205-0001 with phone installed

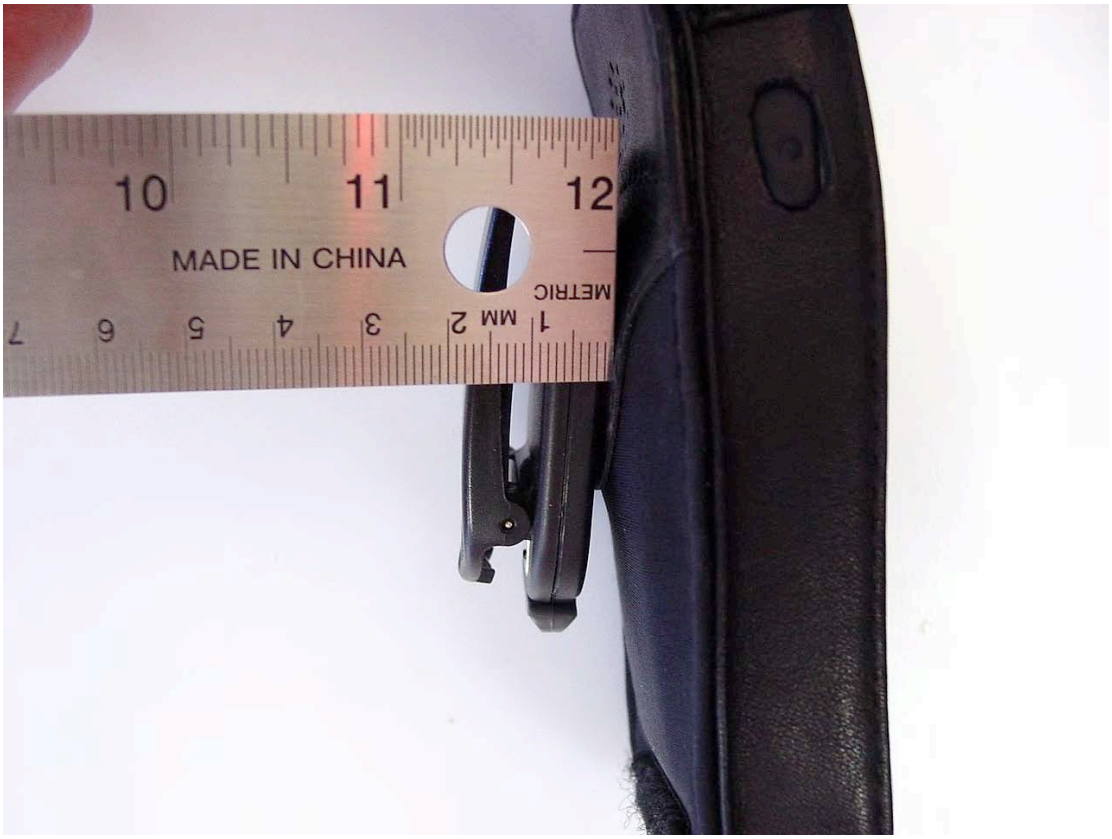
Figure A-4 Side view of leather holster MCN 700-47205-0001 showing clip dimension

Figure A-5 Front view of leather holster MCN (part number) 700-47205-0002 (not tested)

Figure A-6 Front view of leather holster MCN 700-47205-0002 with flap open

Figure A-7 View of leather holster 700-47205-0002 (not tested) with phone installed, flap open

Figure A-8 Side view of leather holster 700-47205-0002 (not tested) showing clip dimension



A.3 Test Set-up

A.3.1 Description

The Qsec-2700 was put into the holster and mounted into the device positioning holder such that the phone was parallel with the bottom of the flat portion of the phantom, facing away from the phantom, and the ear (near field) speaker was aligned with the crosshairs on the phantom. The phone was then positioned up against the phantom with the clip touching. Photos of phone in position with the holster are shown in Section A.3.2.

A.3.2 Photos

Figure A-9 Overall view of test set-up

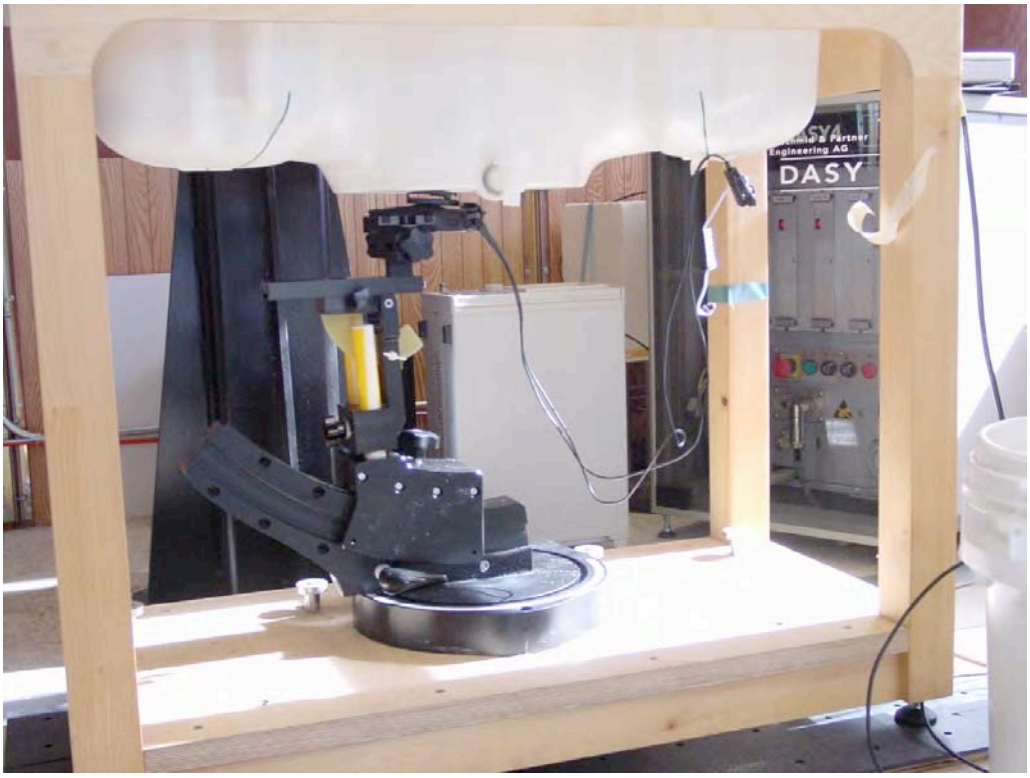


Figure A-10 Close-up side view of phone in position

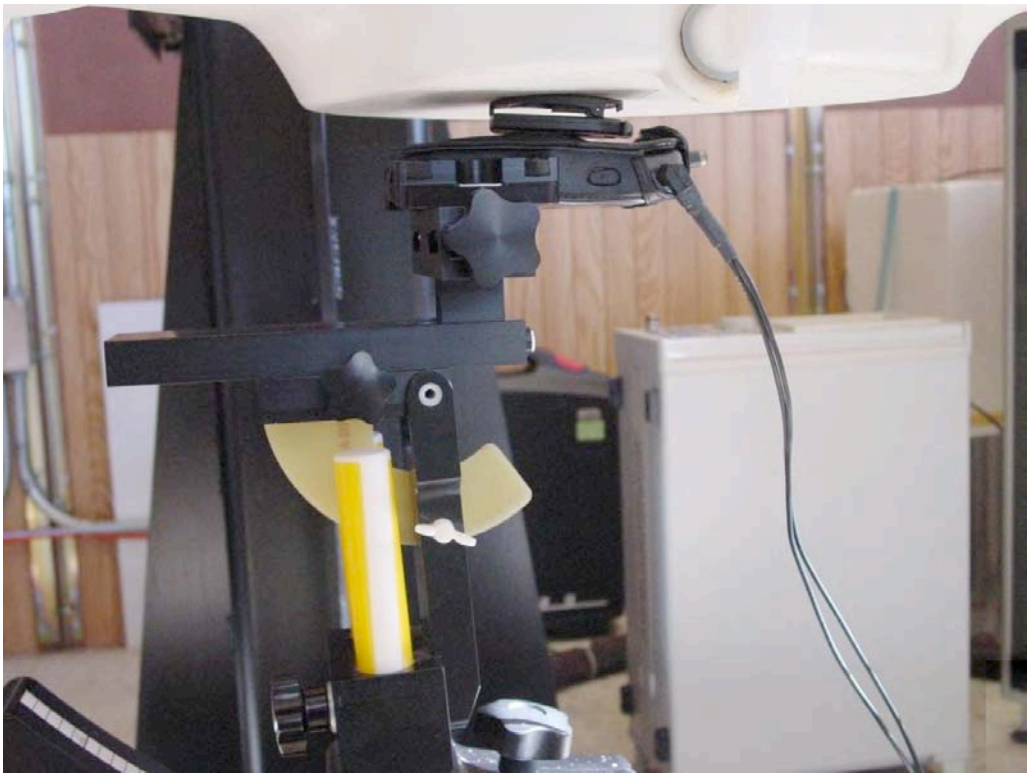


Figure A-11 Bottom view of phone in position (looking up at phantom)

A.4 Validation

Table A-1 shows validation data for the respective days of the test program.

Table A-1 SAR Validation Data for QSEC-2700 with optional leather holster Test Program

		1 g SAR (mW/g)			
Date	**Frequency (MHz)**	**Measured @ 20 dBm input**	**Scaled to 24 dBm**	**Target**	**Difference (%)**
11/19/2004	900	1.14	2.86	2.74	4.2%
11/22/2004	1900	3.84	9.9	10.3	-3.9%

A.5 Liquid Dielectric

Table A-2 shows permittivity and conductivity values of the liquid dielectric mediums measured on the days of testing.

Table A-2 Tissue Dielectric Properties at the Time of Testing

			Permittivity (e_r)				Conductivity (s)			
Date	**Frequency (MHz)**	**Section**	**Measured Values**	**Target Values**	**Deviation (%)**	**Limit**	**Measured Values**	**Target Values**	**Deviation (%)**	**Limit**
	824.7	Body	55.75	56.11	-0.64%	5%	0.978	0.97	0.82%	5%
	836.51		55.81	56.11	-0.53%	5%	0.995	0.97	2.58%	5%
	848.31		55.64	56.11	-0.84%	5%	1.008	0.97	3.92%	5%
	1851.25	Body	53.98	54.3	-0.59%	5%	1.443	1.44	0.21%	5%
	1880		53.83	54.3	-0.87%	5%	1.471	1.44	2.15%	5%
	1908.75		53.69	54.3	-1.12%	5%	1.508	1.44	4.72%	5%

A.6 Results

A.6.1 Test Data

Tables A-3 and A-4 give 1 g SAR data for Qsec-2700 with leather holster in body position for Band Classes 0 and 1 respectively.

Table A-3 1 g SAR for Qsec-2700 with leather holster, Band Class 0 (Cellular)

Ch.	**Section**	**Position**	**Cond. Power (dBm)**	**1 g (mW/g)**	**Air temp (°C)**	**Liq. Temp (°C)**	**Humidity (%)**
1013	Flat	Holster	23.8	0.414	21	23	47
383	Flat	Holster	23.8	0.514	21	23	47
777	Flat	Holster	23.8	0.484	21	22	47

Table A-4 1 g SAR for Qsec-2700 with leather holster, Band Class 1 (PCS)

Ch.	Section	Position	Cond. Power (dBm)	1 g (mW/g)	Air temp (°C)	Liq. Temp (°C)	Humidity (%)
25	Flat	Holster	22.5	0.185	21	22	45
600	Flat	Holster	23.1	0.233	21	22	45
1175	Flat	Holster	23.1	0.299	21	22	45

A.6.2 Plots

On the following pages are scan plots from the DASY4 SEMCAD software.

Date/Time: 11/19/04 11:13:06

Test Laboratory: QUALCOMM Incorporated

2004-11-19 Val 900-20 dBm

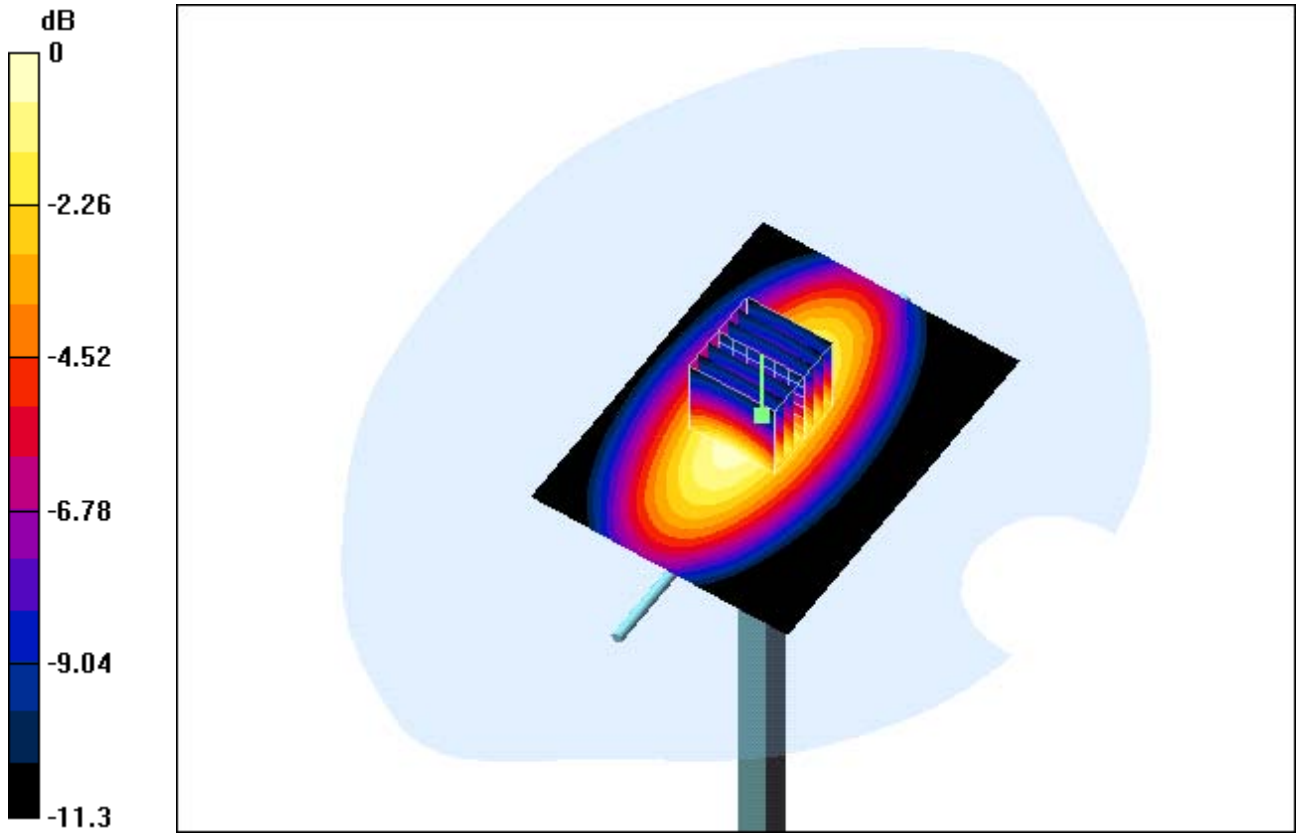
DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:083

Communication System: CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 900 MHz; σ = 1.01 mho/m; ε_r = 43.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1543; ConvF(5.97, 5.97, 5.97); Calibrated: 5/27/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn566; Calibrated: 4/29/2004
- Phantom: SAM with CRP; Type: SAM; Serial: 209
- Measurement SW: DASY4, V4.2 Build 37; Postprocessing SW: SEMCAD, V1.8 Build 109

d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 37.2 V/m; Power Drift = -0.2 dB
Maximum value of SAR (interpolated) = 1.25 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 37.2 V/m; Power Drift = -0.2 dB
Maximum value of SAR (measured) = 1.24 mW/g
Peak SAR (extrapolated) = 1.75 W/kg
SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.723 mW/g



0 dB = 1.24mW/g

Date/Time: 11/22/04 11:44:22

Test Laboratory: QUALCOMM Incorporated

2004-11-22 Val 1900-20 dBm

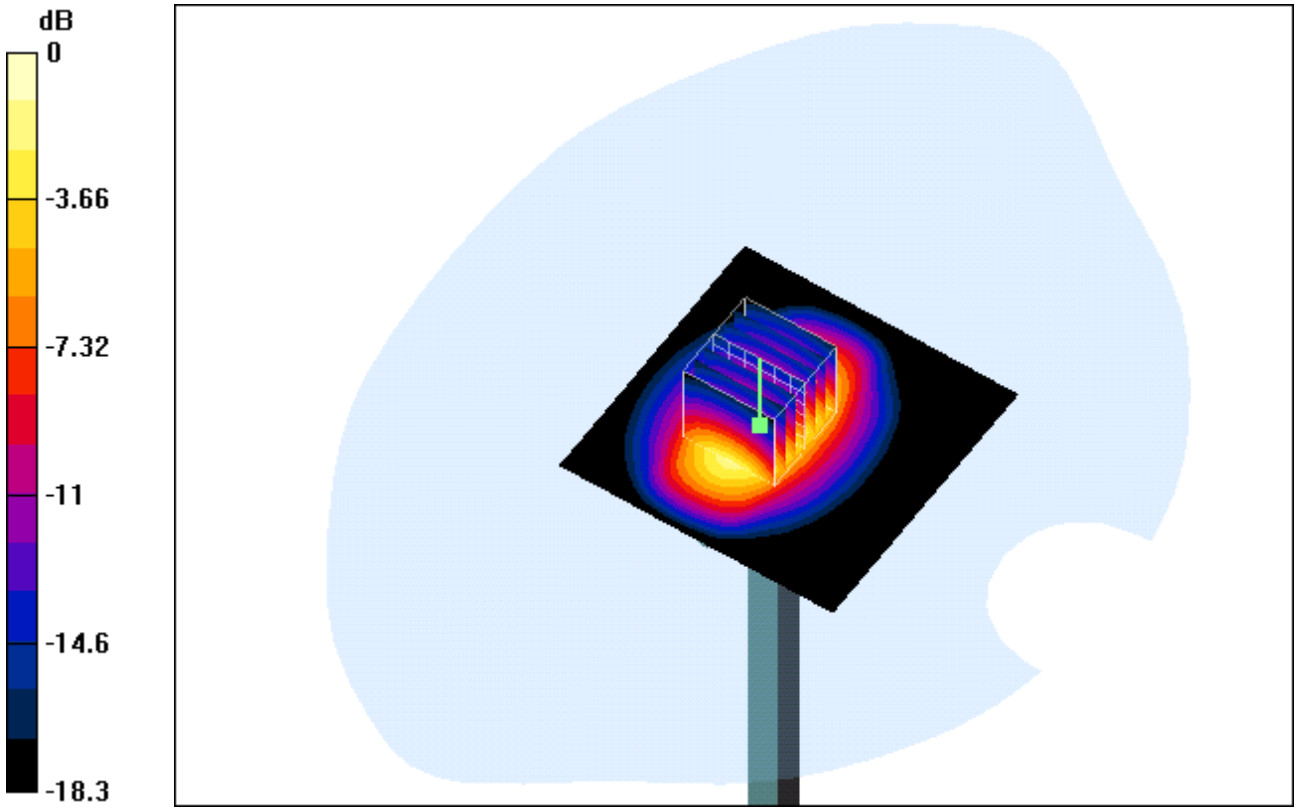
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d019

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1800 Medium parameters used: f = 1900 MHz; σ = 1.54 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1534; ConvF(5.19, 5.19, 5.19); Calibrated: 3/18/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn566; Calibrated: 4/29/2004
- Phantom: SAM with CRP; Type: SAM; Serial: 209
- Measurement SW: DASY4, V4.2 Build 37; Postprocessing SW: SEMCAD, V1.8 Build 109

d=10mm, Pin=20 dBm/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 57.5 V/m; Power Drift = 0.0 dB
Maximum value of SAR (interpolated) = 4.8 mW/g

d=10mm, Pin=20 dBm/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.5 V/m; Power Drift = 0.0 dB
Maximum value of SAR (measured) = 4.43 mW/g
Peak SAR (extrapolated) = 7.08 W/kg
SAR(1 g) = 3.94 mW/g; SAR(10 g) = 2.03 mW/g



0 dB = 4.43mW/g

Date/Time: 11/19/04 12:07:30

Test Laboratory: QUALCOMM Incorporated

2004-11-19 sn 361 Flat - holster-CDMA

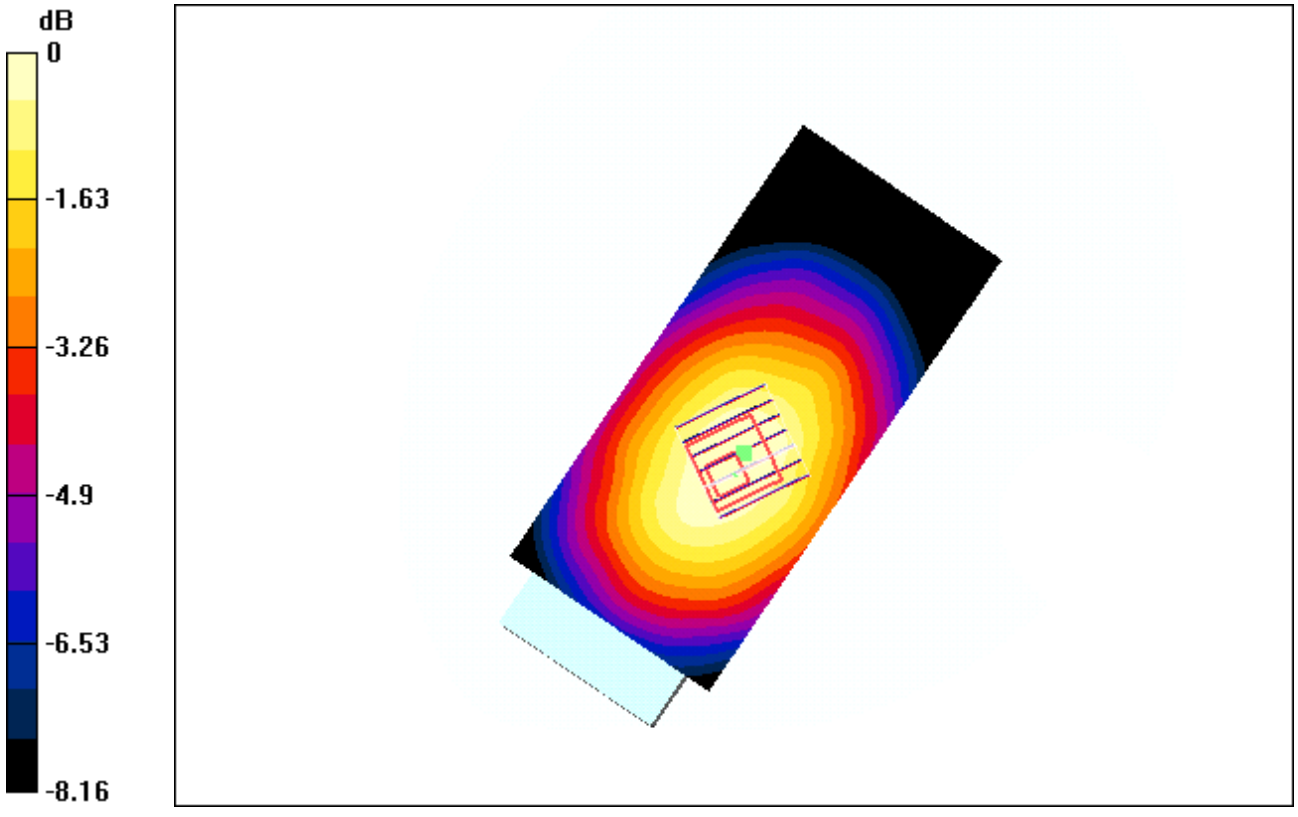
DUT: Casper; Type: Phone; Serial: P2b-361

Communication System: CDMA835; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: HSL835 Body Medium parameters used: f = 824.7 MHz; σ = 0.978 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1543; ConvF(5.82, 5.82, 5.82); Calibrated: 5/27/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn566; Calibrated: 4/29/2004
- Phantom: SAM with CRP; Type: SAM; Serial: 209
- Measurement SW: DASY4, V4.2 Build 37; Postprocessing SW: SEMCAD, V1.8 Build 109

Belt Clip - Low/Area Scan (61x131x1): Measurement grid: dx=12mm, dy=12mm
Reference Value = 14.9 V/m; Power Drift = -0.3 dB
Maximum value of SAR (interpolated) = 0.442 mW/g

Belt Clip - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.9 V/m; Power Drift = -0.3 dB
Maximum value of SAR (measured) = 0.436 mW/g
Peak SAR (extrapolated) = 0.538 W/kg
SAR(1 g) = 0.414 mW/g; SAR(10 g) = 0.306 mW/g



0 dB = 0.436mW/g

Date/Time: 11/19/04 12:07:30

Test Laboratory: QUALCOMM Incorporated

2004-11-19 sn 361 Flat - holster-CDMA

DUT: Casper; Type: Phone; Serial: P2b-361

Communication System: CDMA835; Frequency: 836.49 MHz;Duty Cycle: 1:1
Medium: HSL835 Body Medium parameters used (interpolated): f = 836.49 MHz; σ = 0.994 mho/m; ε_r = 55.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

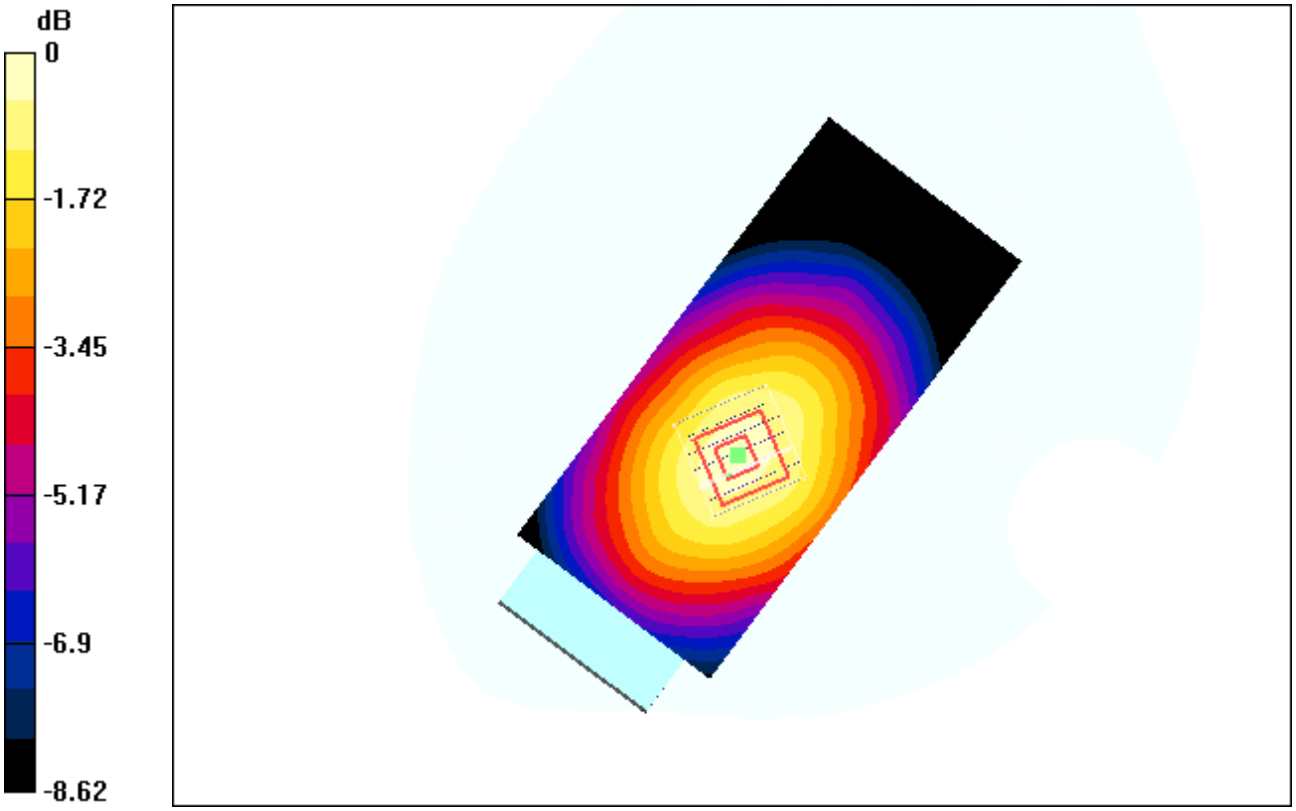
DASY4 Configuration:
- Probe: ET3DV6 - SN1543; ConvF(5.82, 5.82, 5.82); Calibrated: 5/27/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn566; Calibrated: 4/29/2004
- Phantom: SAM with CRP; Type: SAM; Serial: 209
- Measurement SW: DASY4, V4.2 Build 37; Postprocessing SW: SEMCAD, V1.8 Build 109

Belt Clip - Middle/Area Scan (61x131x1): Measurement grid: dx=12mm, dy=12mm
Reference Value = 15.4 V/m; Power Drift = -0.2 dB
Maximum value of SAR (interpolated) = 0.542 mW/g

Info: Interpolated medium parameters used for SAR evaluation!

Belt Clip - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.4 V/m; Power Drift = -0.2 dB
Maximum value of SAR (measured) = 0.551 mW/g
Peak SAR (extrapolated) = 0.715 W/kg
SAR(1 g) = 0.514 mW/g; SAR(10 g) = 0.375 mW/g

Info: Interpolated medium parameters used for SAR evaluation!



0 dB = 0.551mW/g

Date/Time: 11/19/04 12:07:30

Test Laboratory: QUALCOMM Incorporated

2004-11-19 sn 361 Flat - holster-CDMA

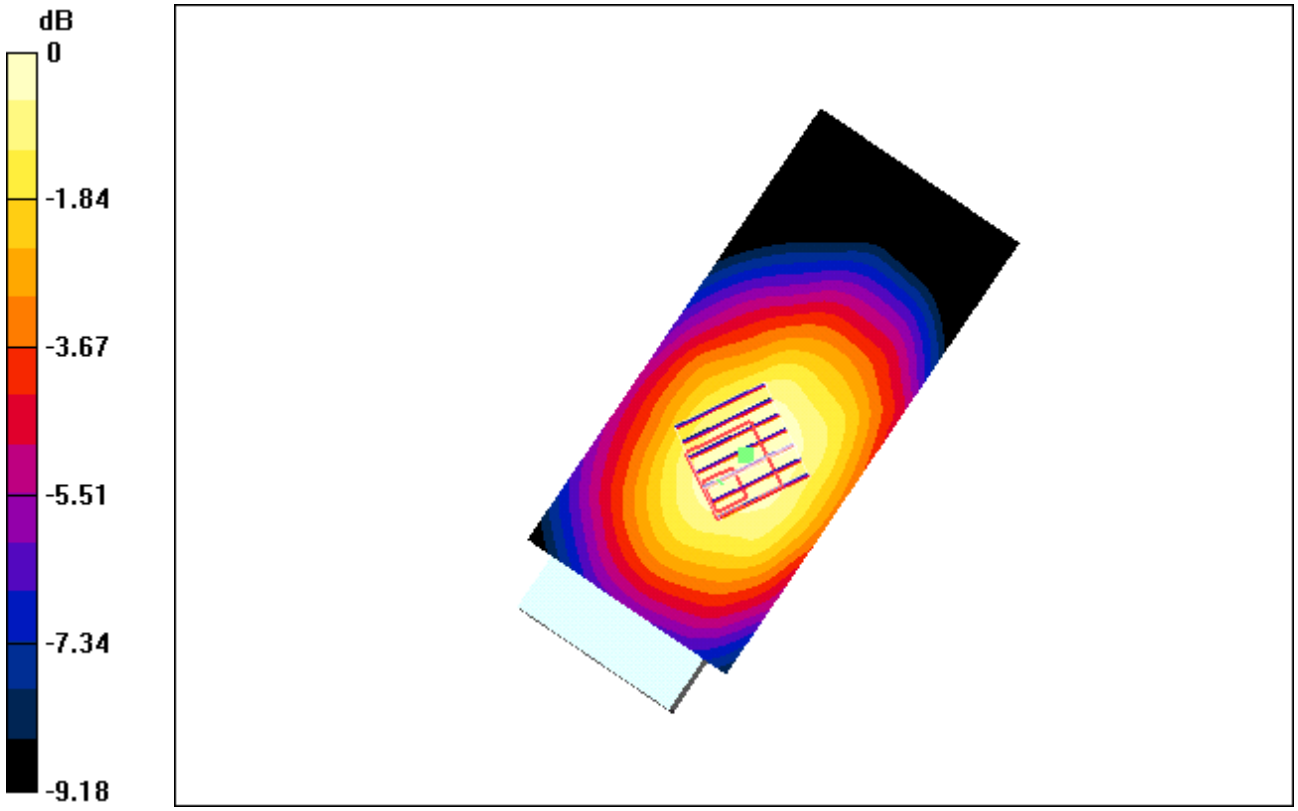
DUT: Casper; Type: Phone; Serial: P2b-361

Communication System: CDMA835; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: HSL835 Body Medium parameters used: f = 848.31 MHz; σ = 1.01 mho/m; ε_r = 55.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1543; ConvF(5.82, 5.82, 5.82); Calibrated: 5/27/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn566; Calibrated: 4/29/2004
- Phantom: SAM with CRP; Type: SAM; Serial: 209
- Measurement SW: DASY4, V4.2 Build 37; Postprocessing SW: SEMCAD, V1.8 Build 109

Belt Clip - High/Area Scan (61x131x1): Measurement grid: dx=12mm, dy=12mm
Reference Value = 13.9 V/m; Power Drift = 0.4 dB
Maximum value of SAR (interpolated) = 0.557 mW/g

Belt Clip - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.9 V/m; Power Drift = 0.4 dB
Maximum value of SAR (measured) = 0.533 mW/g
Peak SAR (extrapolated) = 0.671 W/kg
SAR(1 g) = 0.484 mW/g; SAR(10 g) = 0.341 mW/g



0 dB = 0.533mW/g