This document was generated in response to a request for additional technical information by Frank Coperich in regards to the type approval of the QCP-2760. The information included is related to the four specific topics discussed in the following email received by John Forrester on September 17, 1999:

To: John Forrester, Qualcomm Inc.
From: Frank Coperich
fcoperic@fcc.gov
FCC Application Processing Branch

Re:	CC ID J9CQCP-2760
Applicant:	Qualcomm Incorporated
Correspondence Reference Number:	9668
731 Confirmation Number:	EA94691
Date of Original E-Mail:	09/17/1999

1. The operators manual indicates this phone has provision for headset and leather case to allow hands-free operations. This would allow this phone to operate in body-worn configurations and SAR for such operating conditions should be addressed. Information for the type or specific body-worn holster or carrying case should be provided, especially the separation distance provided by the holster for body-worn use and any metallic components in the belt-clip or other parts of the holster. Caution statements should also be included in the operators manual to alert users on how to use the holster(s) and those that have not been SAR tested might not comply with FCC RF exposure requirements and should not be used. Similar operating instructions should also be included in the manual for operating under body-worn conditions in data mode (Internet access etc.) instead of using a headset.

2. This phone has several battery options, an internal and one (or more ?) external batteries. Please clarify which battery was used on the phone tested for SAR and the amount of SAR variations to be expected due to the different battery options - either by tests or other supporting information to indicate there is sufficient SAR margin to cover any variation due to battery options. The same battery issues should also be address for body-mount operations, with respect to SAR/performance and battery thickness/body separation distance.

3. Dipole validation results obtained before the SAR tests and original validation data provided by SAR system manufacturer for cellular and PCS band should be provided to support system accuracy.

4. Please indicate the crest factor(s) used in the SAR tests

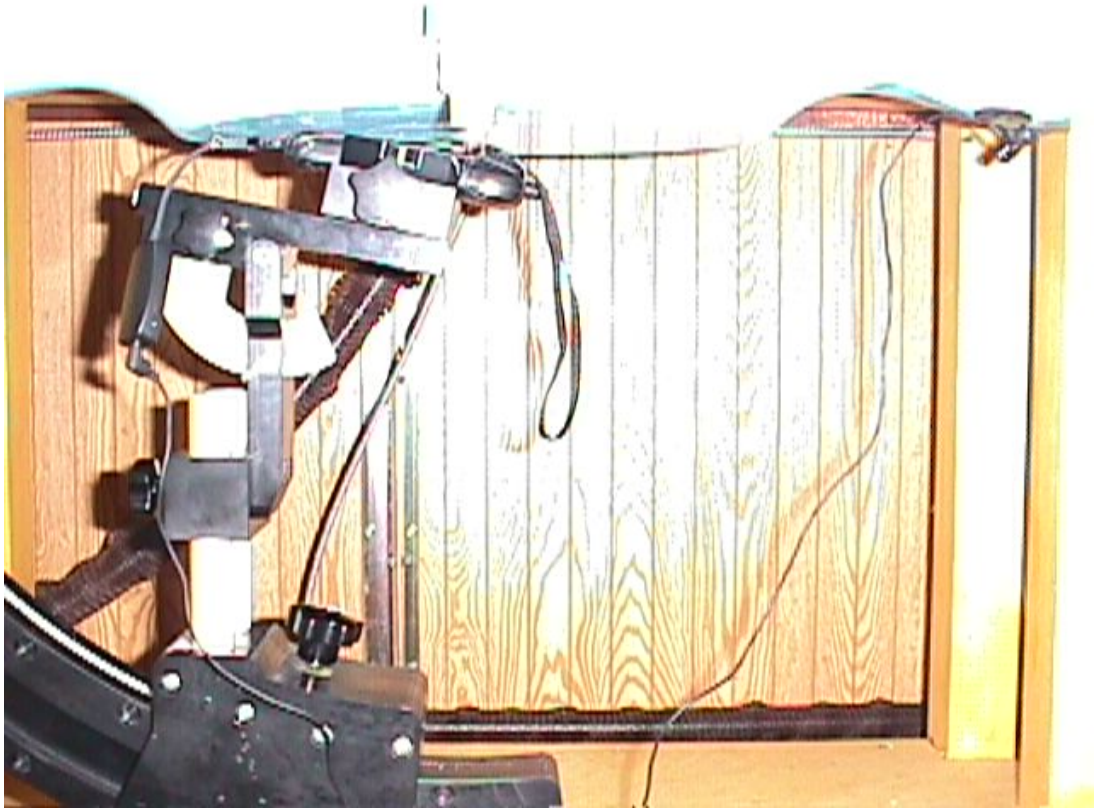
1) SAR with leather case and headset when phone is worn on torso

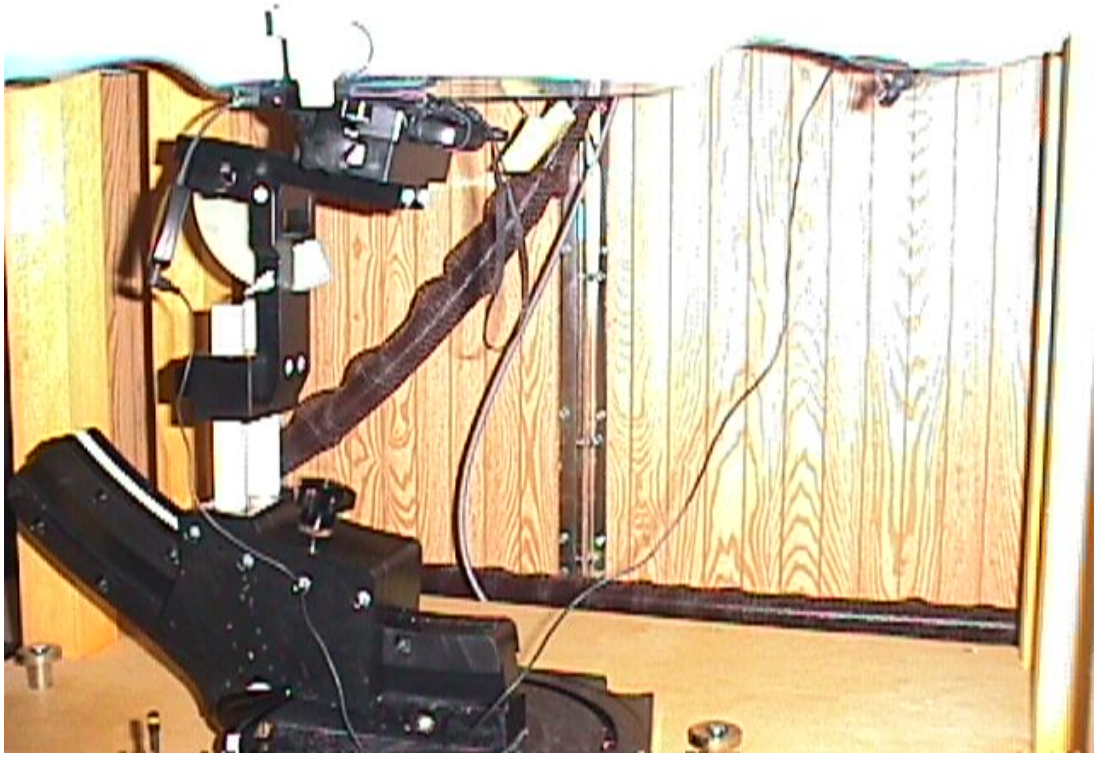
The QCP-2760's operator's manual has been modified to include a warning to alert users that body-worn accessories not tested by Qualcomm may not meet FCC RF exposure requirements.

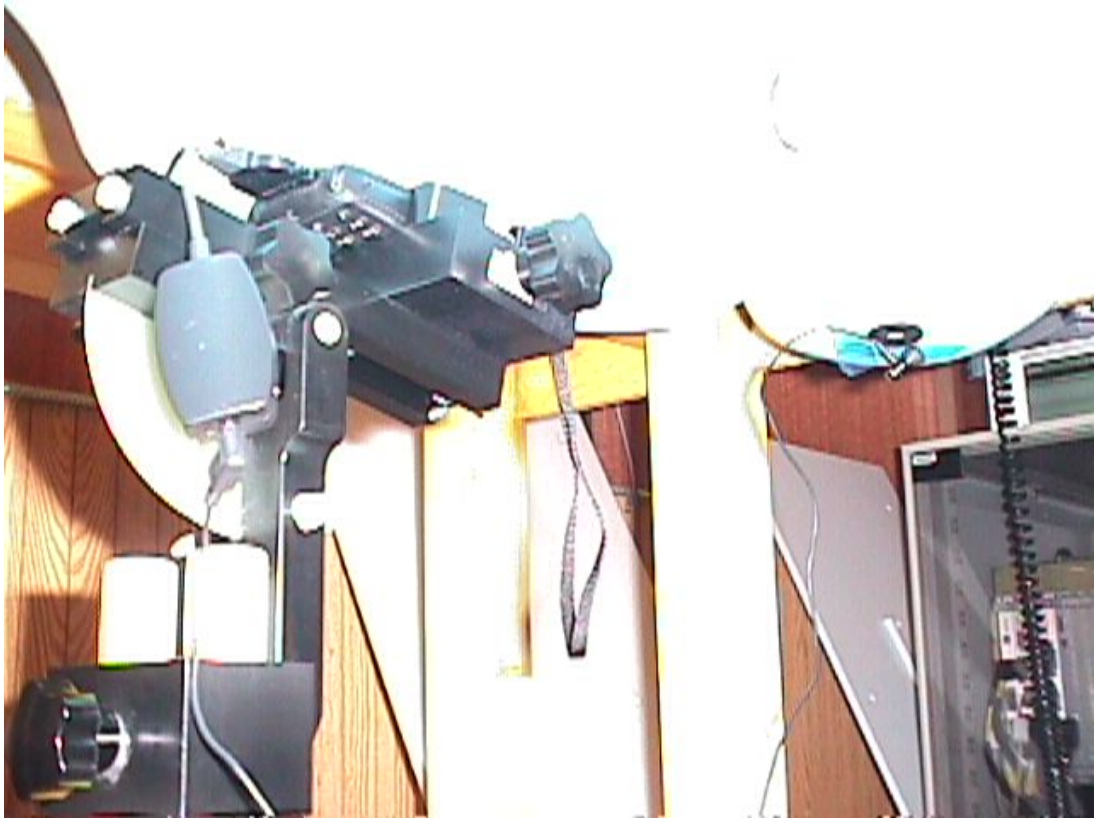
The following caption is incorporated into the user's manual:

> **Caution: Only QUALCOMM-supplied leather cases have been tested to meet FCC RF exposure requirements. Other devices may not meet this requirement.**

To verify that the QCP-2760 is indeed SAR compliant, additional SAR testing was performed with the a leather case and headset. The phone was then attached to a flat phantom, and tested for SAR compliance. The unit was tested at the worst case frequency and antenna position (retracted) for both FM and PCS modes. The testing concluded that the unit meets the SAR limit of 1.6 mW/g. Photos, test data, and dipole verification documents related to these tests are in the proceeding pages.

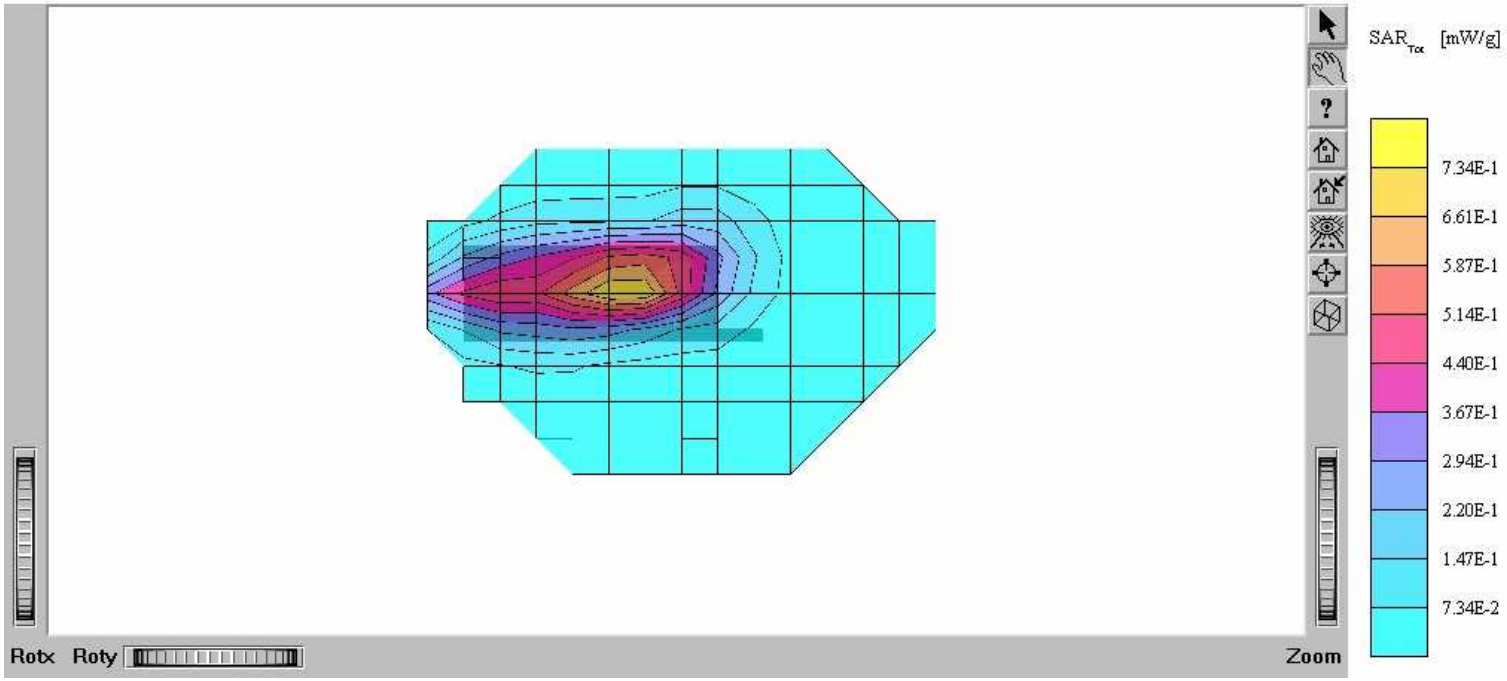






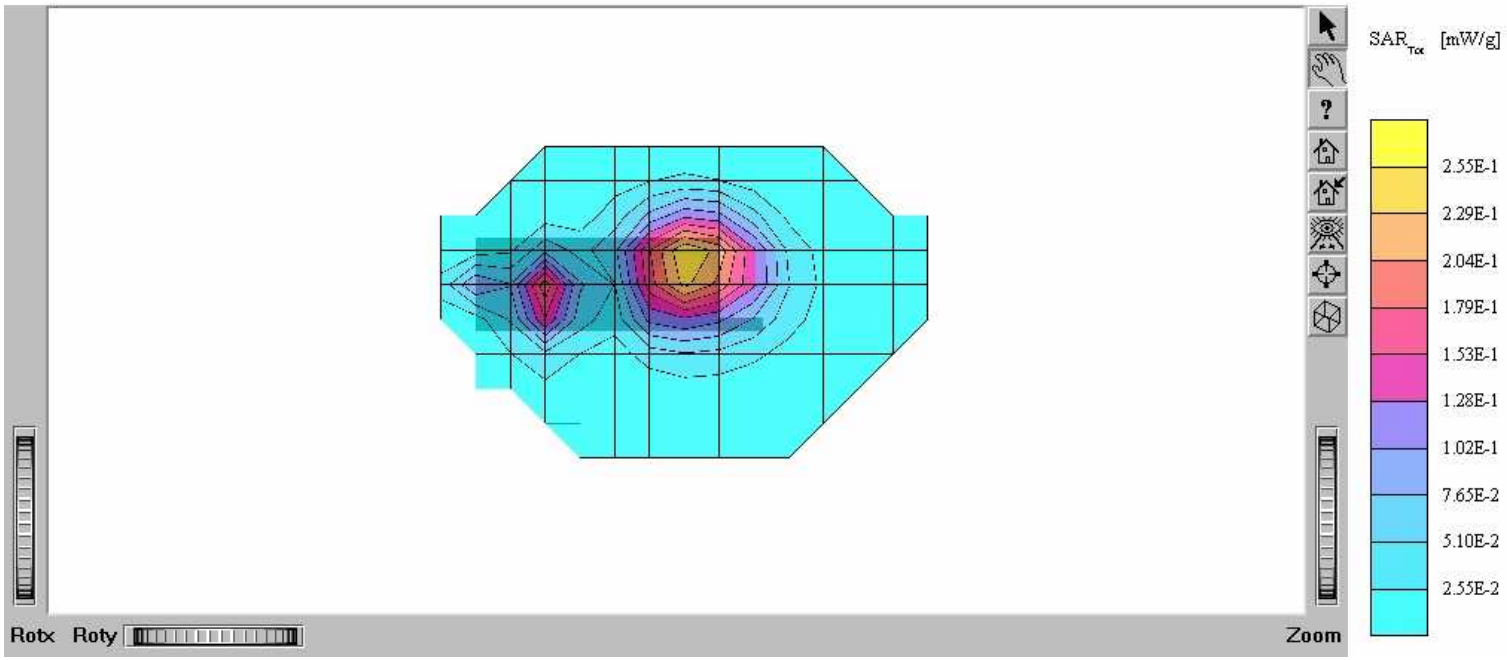
QCP 2760 P3C MCN: 61-54476-1, SERIAL NUMBER 043 9-17-99, CHANNEL 991 AMPS, FLAT PHANTOM, PHONE INVERTED WITH LEATHER CASE, HEADSET ATTACHED

SAR (1g): 0.947 [mW/g] ± 0.08 dB, SAR (10g): 0.569 [mW/g] ± 0.12 dB
Cubes (2) (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.90,5.90,5.90)
Brain 900 MHz: $\sigma = 0.87$ [mho/m] $\varepsilon_r = 42.5$ $\rho = 1.00$ [g/cm^3]
File Name: QCP 2760 9-17-99 #10.DA3
Operator: DL



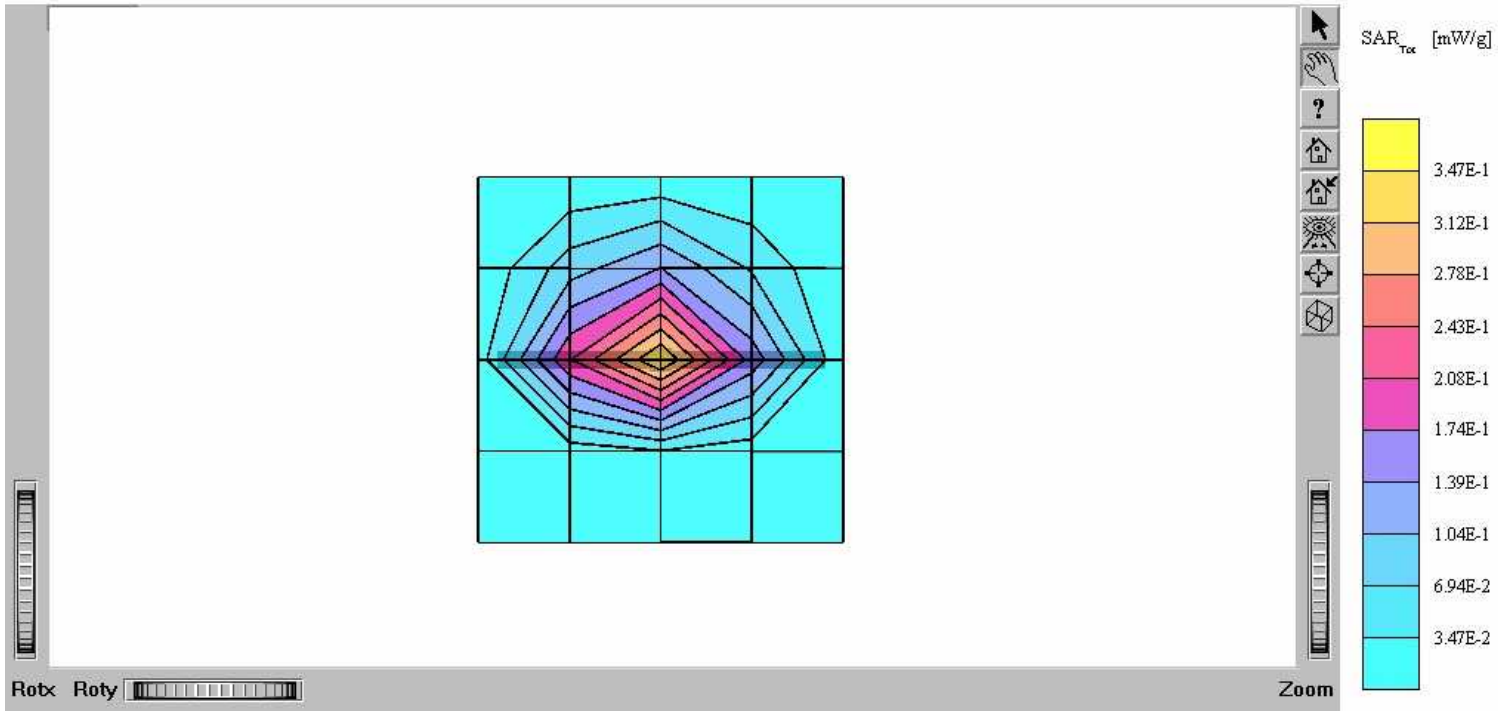
QCP 2760 P3C MCN: 61-54476-1, SERIAL NUMBER 043 9-17-99, CHANNEL 600 CDMA FLAT PHANTOM, PHONE INVERTED WITH LEATHER CASE, HEADSET ATTACHED

CH 600
SAR (1g): 0.269 [mW/g] ± 0.06 dB, SAR (10g): 0.152 [mW/g] ± 0.07 dB
Cubes (2) (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.00,5.00,5.00)
Brain 1800 MHz: σ = 1.70 [mho/m] ε_r = 39.5 ρ = 1.00 [g/cm^3]
File Name: QCP 27609-17-99 #18.DA3
Operator: DL



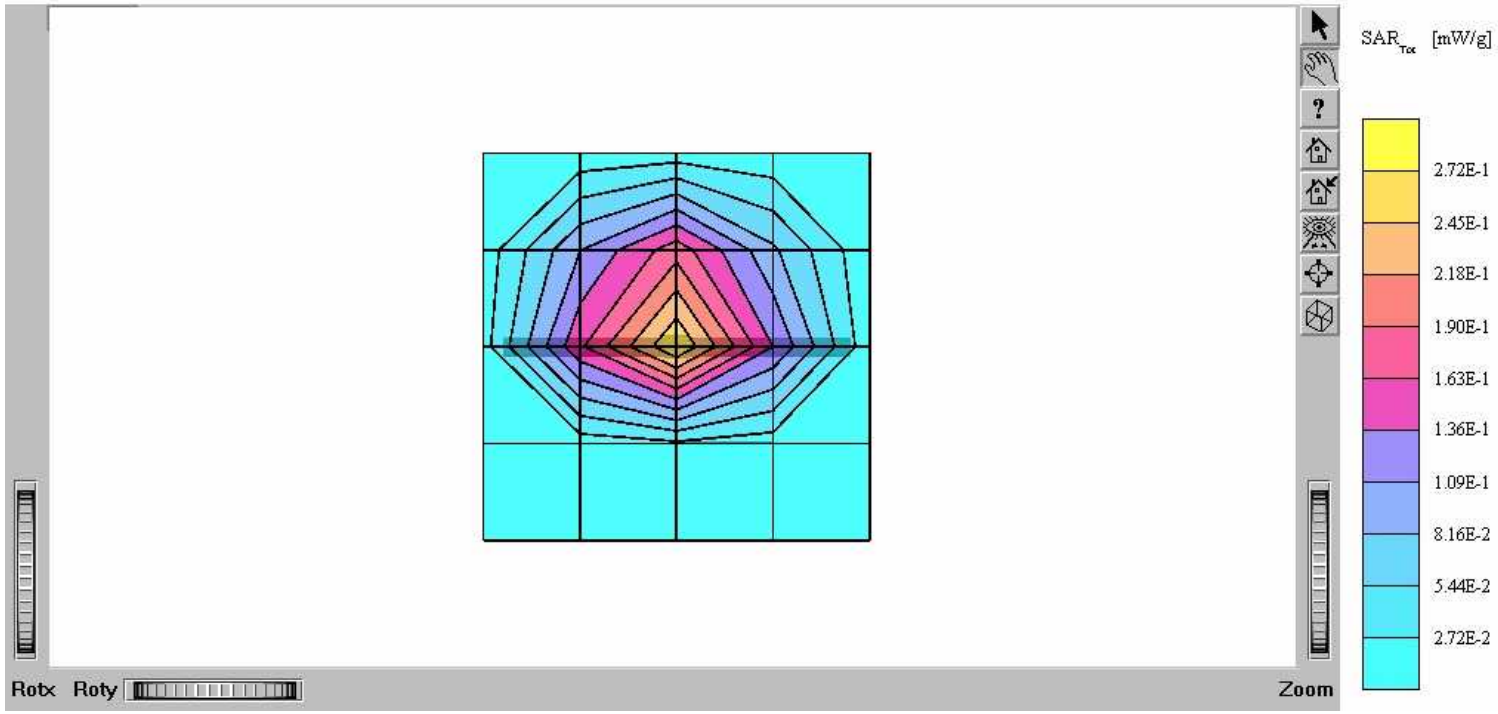
VALIDATION 1800MHz 9-17-99

SAR (1g): 0.405 [mW/g] ± 0.35 dB, SAR (10g): 0.204 [mW/g] ± 0.35 dB
Cubes (2) (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348
Brain 1800 MHz: $\sigma = 1.70$ [mho/m] $\varepsilon_r = 39.5$ $\rho = 1.00$ [g/cm^3]
File Name: 9-17-99.da3
Operator: DWS



VALIDATION 1800MHz 6-21-99

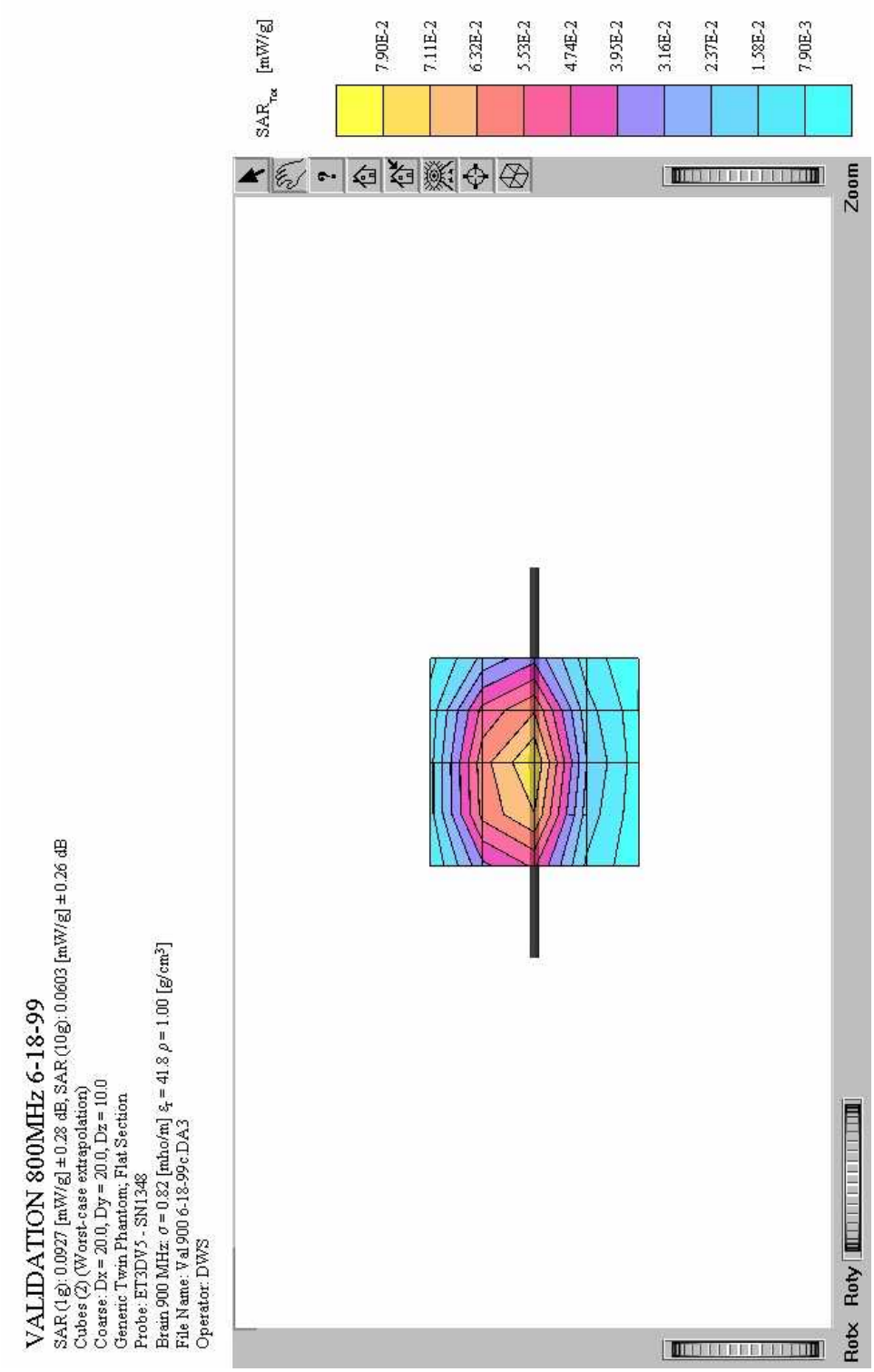
SAR (1g): 0.374 [mW/g] ± 0.32 dB, SAR (10g): 0.191 [mW/g] ± 0.29 dB
Cubes (2) (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348
Brain 1800 MHz: σ = 1.62 [mho/m] ε_r = 42.3 ρ = 1.00 [g/cm^3]
File Name: Val 1800 MHz 6-21-99a.DA3
Operator: DWS



2) Battery options with phone

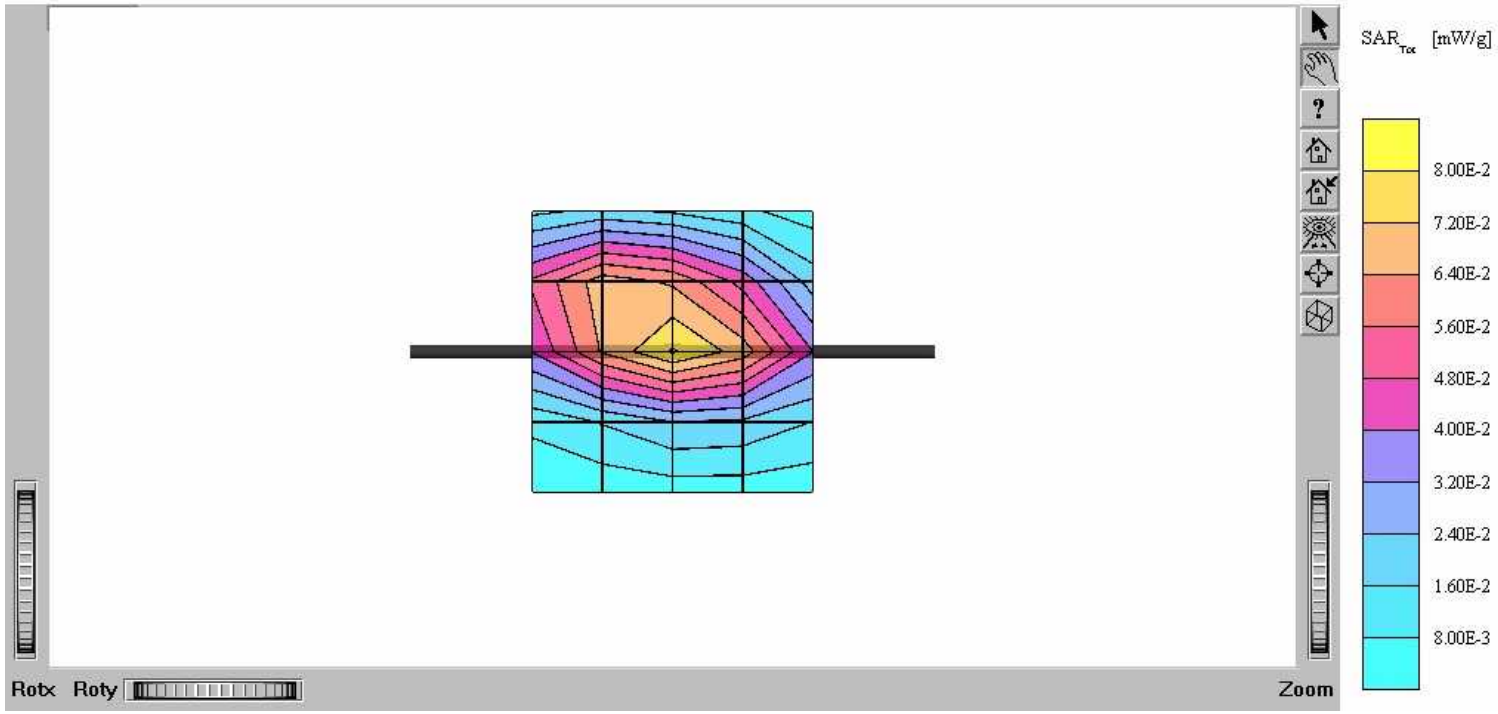
It was determined that the smallest battery resulted in the worst case SAR because of the higher current densities, and as such the data submitted is for the worst case. It was determined that the worst case configuration was when the phone used with the internal battery only. When external batteries are added, the current density decreases due to the physical volume added to the unit. For this reason, the SAR testing was performed with the internal battery only.

3) SAR validation results for original SAR testing



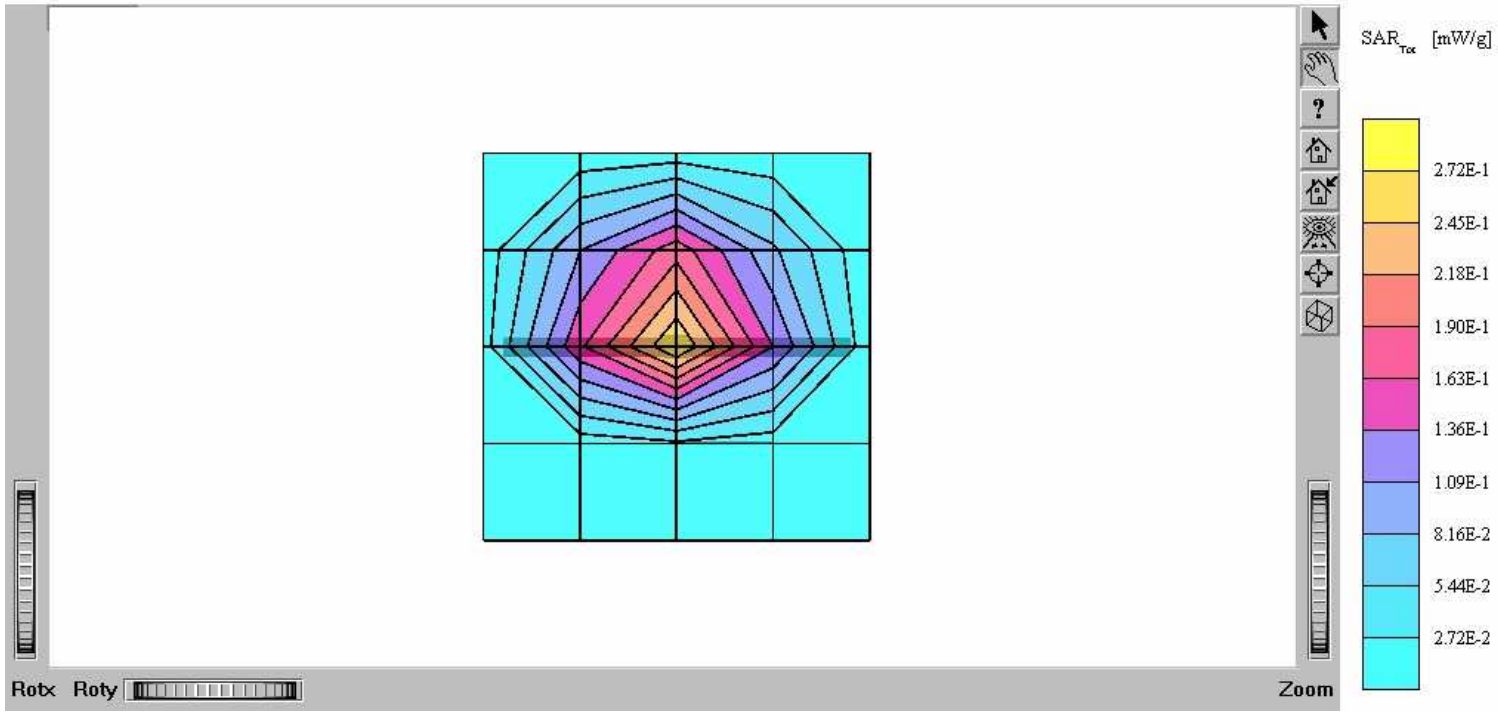
VALIDATION 800MHz 6-19-99

SAR (1g): 0.0921 [mW/g] ± 0.19 dB, SAR (10g): 0.0605 [mW/g] ± 0.19 dB
Cubes (2) (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348
Brain 900 MHz: $\sigma = 0.82$ [mho/m] $\varepsilon_r = 41.8$ $\rho = 1.00$ [g/cm^3]
File Name: Val 900 6-19-99.DA3
Operator: DWS



VALIDATION 1800MHz 6-21-99

SAR (1g): 0.374 [mW/g] ± 0.32 dB, SAR (10g): 0.191 [mW/g] ± 0.29 dB
Cubes (2) (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348
Brain 1800 MHz: σ = 1.62 [mho/m] ε_r = 42.3 ρ = 1.00 [g/cm^3]
File Name: Val 1800 MHz 6-21-99a.DA3
Operator: DWS



Manufacturer Calibration Data:

Schmid & Partner
Engineering AG

Staffelstrasse 8, 8045 Zurich, Switzerland, Telefon +41 1 280 08 60, Fax +41 1 280 08 64

DASY

Dipole Validation Kit

Type: D900V2

Serial: 024

Manufactured: December 1997
Calibrated: January 1998

1. Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom (shell thickness 2mm) filled with brain simulating sugar solution of the following electrical parameters at 900 MHz:

Relative Dielectricity	**42.3**	± 5%
Conductivity	**0.85 mho/m**	± 5%

The DASY3 System (Software version 1.0a) with a dosimetric E-field probe ET3DV4 (SN:1302, Conversion factor 5.5) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the centre marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole centre to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging. The dipole input power (forward power) was 250mW ± 3 %. The results are normalised to 1W input power.

2. SAR Measurement

Standard SAR-measurements were performed with the phantom according to the measurement conditions described in section 1. The results have been normalised to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over 1 cm^3 (1 g) of tissue:	**9.44 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**6.16 mW/g**

Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well. The estimated sensitivities of SAR-values and penetration depths to the liquid parameters are listed in the DASY Application Note 4: 'SAR Sensitivities'.

3. Dipole Impedance and return loss

The impedance was measured at the SMA-connector with a network analyser and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.397 ns**	(one direction)
Transmission factor:	**0.988**	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 900 MHz:	Re{Z} = **50.2 Ω**
	Im {Z} = **-0.0 Ω**
Return Loss at 900 MHz	**- 54.9 dB**

4. Handling

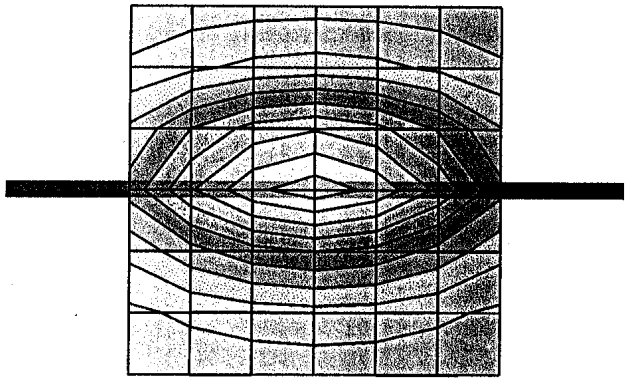
The dipole is made of standard semirigid coaxial cable. The centre conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

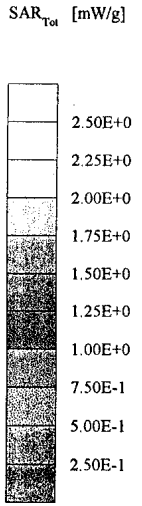
Do not apply excessive force to the dipole arms, because they might bend. If the dipole arms have to be bent back, take care to release stress to the soldered connections near the feedpoint; they might come off.

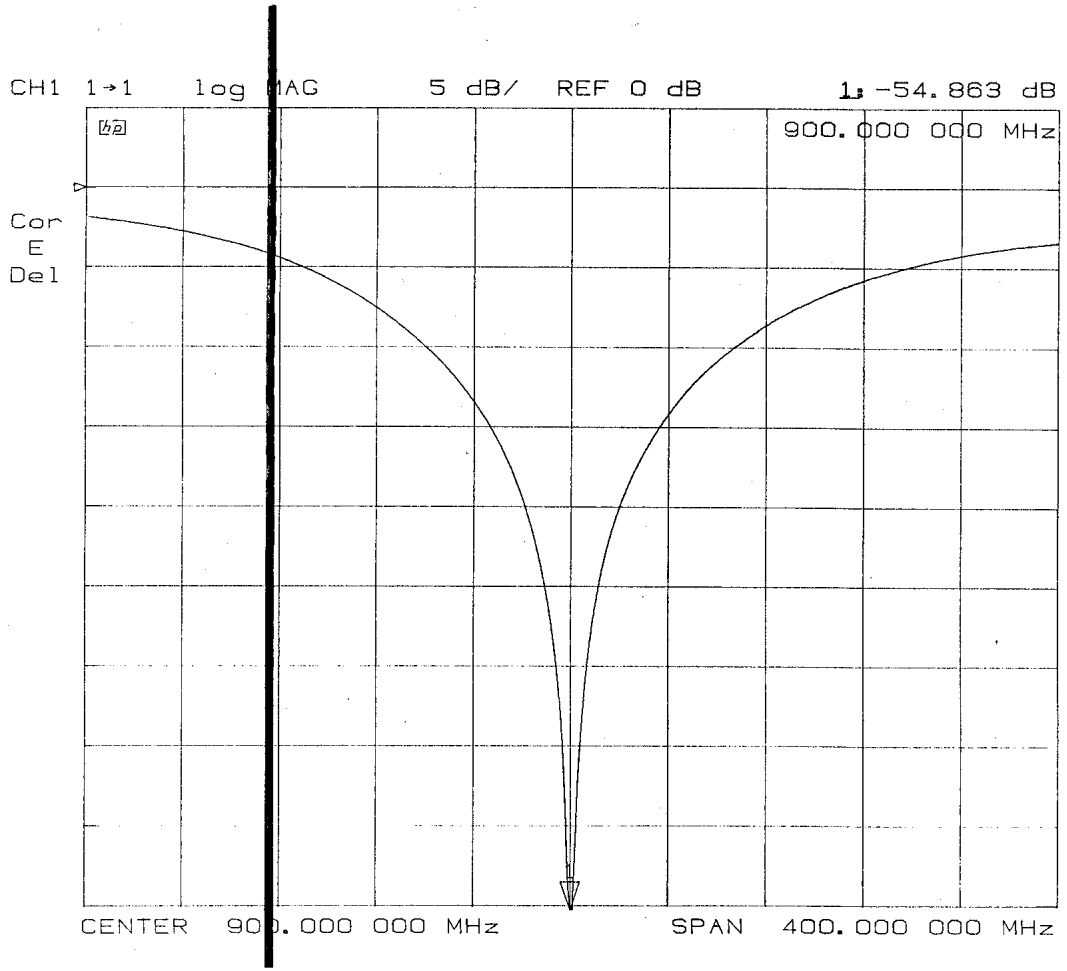
After prolonged use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

Validation Dipole D900V2 SN:024, d = 15mm

Frequency: 900 [MHz]; Antanna Input Power: 250 [mW]
Generic Twin Phantom; Flat Section; Grid Spacing: Dx = 15.0, Dy = 15.0, Dz = 10.0 [mm]
Probe: ET3DV5 - SN1302 DAE3; ConvF(5.40,5.40,5.40); Crest factor: 1.0; }: σ = 0.85 [mho/m] ε_r = 42.3 ρ = 1.00 [g/cm³]
Cubes (2): Peak: 3.58 [mW/g] ± 0.06 dB, SAR (1g): 2.36 [mW/g] ± 0.05 dB, SAR (10g): 1.54 [mW/g] ± 0.04 dB, (Worst-case extrapolation)
Penetration depth: 13.1 (12.1, 14.4) [mm]
Powerdrift: 0.03 dB







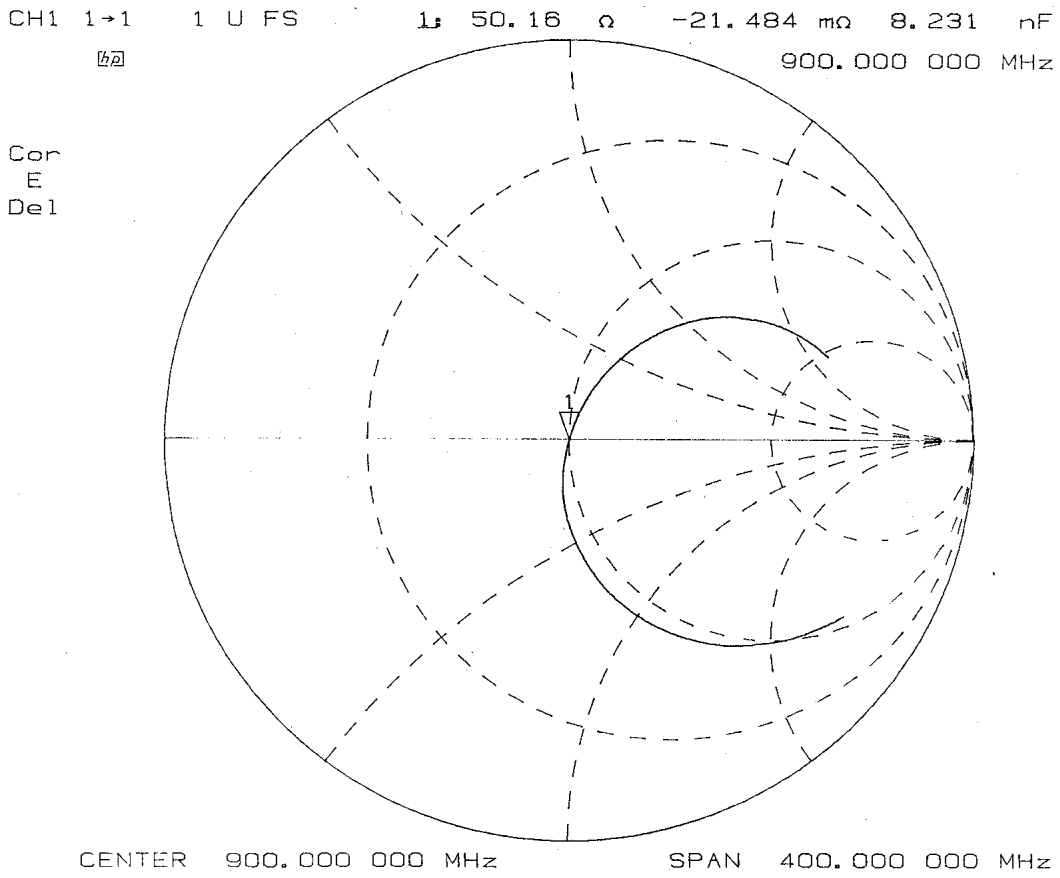
D900V2 SN: 024

S11

Flat phantom with brain simulating solution

d = 15mm

(distance from dipole center to solution)



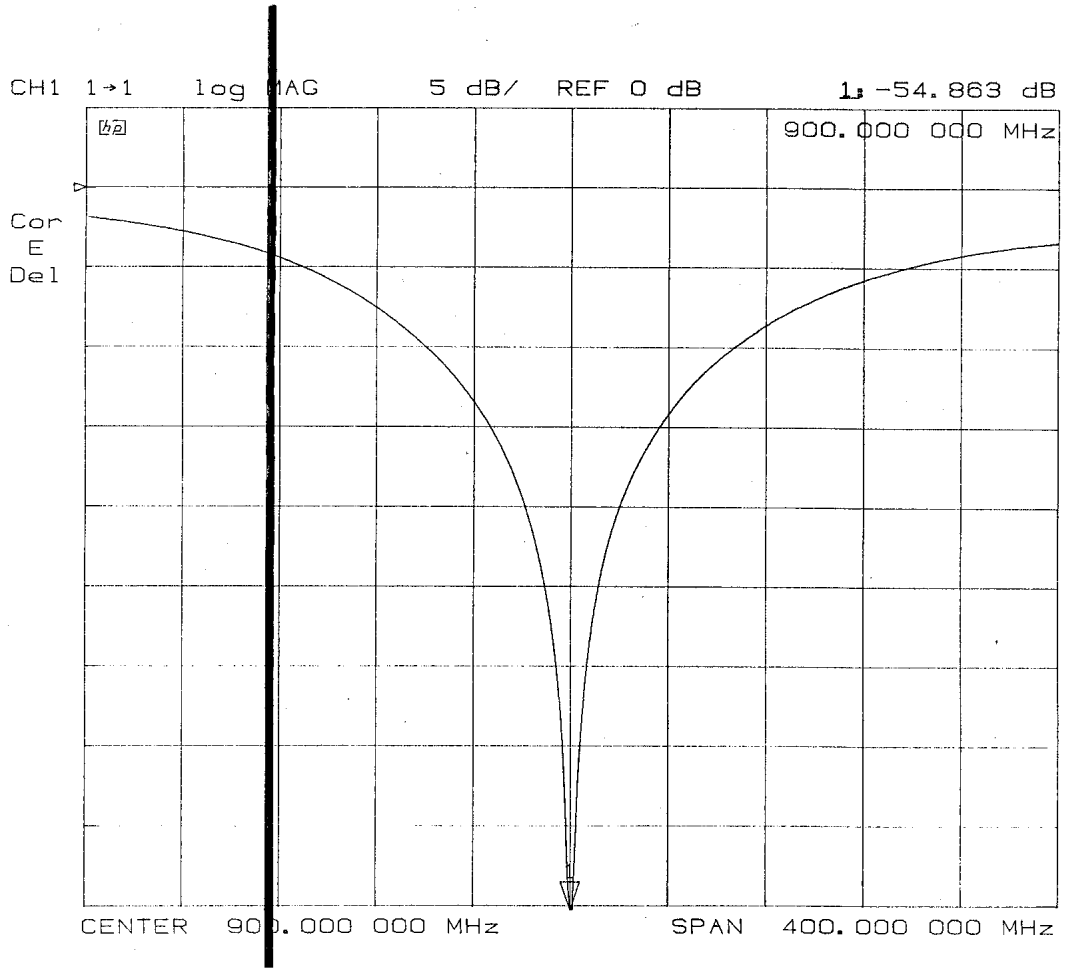
D900V2 SN: 024

S11

Flat phantom with brain simulating solution

d = 15mm

(distance from dipole center to solution)



D900V2 SN: 024

S11

Flat phantom with brain simulating solution

d = 15mm

(distance from dipole center to solution)

4) Crest factors used in SAR tests

The crest factor for all FM analog SAR scans is set to 1.0, and for CDMA it has been experimentally determined to be 4.765 dB. However, this only effects the measurement when the power levels are high to such a degree that there is some saturation of the dipoles in the near field probe. The low power spectral densities of CDMA, for this device, do not approach those power levels and as such it has no effect on these measurements.