



May 11, 1998

Mr. Joseph W. Jackson  
Communication Certification Laboratory  
1940 West Alexander Street  
West Valley City, UT 84119

RE: SAR Testing of Uniden Mini 200 Portable Cellular Telephone

Dear Mr. Jackson:

We have completed SAR testing of the Uniden Mini 200 Portable Cellular Telephone (FCC No. 4 Uniden 73-6492) by operating these units under their own battery power as per the Operating Instructions. The testing was done using the University of Utah Automated SAR Measurement System with the model of the head, neck and upper torso that was filled with a tissue-equivalent material simulating the average electromagnetic properties (dielectric constant  $\epsilon_r$  and electrical conductivity  $\sigma$ ) of the brain. This corresponds to  $\epsilon_r = 45.3$  and  $\sigma = 0.92$  S/m at 835 MHz. A composition of 40.4% water, 56.0% sugar, 2.5% salt (NaCl) and 1.0% HEC gives a measured  $\epsilon_r = 41.1 \pm 1.4$  and  $\sigma = 1.06 \pm 0.05$  S/m. This composition was, therefore, used as the biological phantom material to fill the experimental model for SAR measurements.

The SARs were measured using a calibrated Narda Model 8021 E-field probe which was moved inside the phantom material using a 3-D stepper motor driven system that is controlled by a personal computer (PC). This system has been checked for accuracy of SAR measurements by comparing the results obtained for canonical geometrical shapes such as a rectangular slab and a sphere where the measured SARs have been found to be within  $\pm 10$  percent of the calculated SARs using the well-established finite-difference time-domain (FDTD) numerical electromagnetic technique.

The power output of the Uniden Mini 200 Portable Cellular Telephone was measured by using a coaxial cable which is connected to the output port at the base of the retractable whip antenna. As expected the power output is maximum (296.0 mW) for power level (attenuator) settings 0, 1 and 2 and diminishes rapidly to 3.78 mW for the attenuator setting 7. All of the SAR measurements were therefore done for the cellular telephone set to the maximum radiated power level setting of 0 i.e. 296 mW of radiated power.

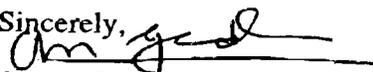
The SAR distributions were measured both when the antenna was completely pulled out or completely retracted. The highest SAR regions for each of the cases were determined in the first instance by using a coarser sampling with a step size of 5.0 mm over a scan area of 8.0 x 8.0 cm. After identifying the region of the highest SAR, the SAR distributions were then measured with a resolution of 2 mm in order to obtain the peak 1 cm<sup>3</sup> or 1-g SAR.

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The peak 1-g SARs measured for the antenna completely pulled out or retracted are 1.02 and 0.84 W/kg, respectively. Both of these values are less than 1.6 W/kg required by the Federal Communications Commission.

Sincerely,   
OM P. GANDHI  
Professor and Chairman

OPG/s

cc: J. Haynes