THE UNIVERSITY OF UTAH

October 8, 1998

Mr. Jim Haynes, Vice President
Engineering and Regulatory Affairs
Uniden Engineering Services
216 John Street
PO Box 580
Lake City, SC 29560

RE: SAR Compliance Testing of Uniden Model DATA 2000 CDPD Modem (FCC ID #AMWUH302)

Dear Mr. Haynes:

This letter is written to supplement our above report dated September 2, 1998 in response to the points of clarification sought by Mr. Kwok Chan of FCC. The first important point needing clarification is the apparent discrepancy between the power measurements done at CCL (Mr. Midgley) and at the University of Utah.

Mr. Midgley at CCL has gone back and redone the measurements of the power output from Uniden Model DATA 2000 CDPD Modem. The data comparing the power outputs measured at CCL and at the University of Utah is given in the following:

Table A. Comparison of the power outputs measured for Uniden Model DATA 2000 CDPD Modem by CCL Inc. and by University of Utah (U of U).

Channel No.	CCL Measurements dBm	U of U Measurements dBm
990	27.2	
999	27.2	
001	28.4	28.8
050	28.4	
100	28.3	
383	27.9	28.2
799	27.4	27.8

As may be seen from the above Table A, there is very little difference (0.3-0.4 dB) between CCL's and U of U's measurements for the three channels (Channels 001, 383, and 799) which had been previously measured at the University of Utah. Since 28.8 dBm (759 mW conducted) is the maximum power measured, we agree that the SARs should, therefore, be scaled to this maximum output power level of 28.8 dBm for determining SAR compliance.

Department of Electrical Engineering
Merrill Engineering Building
50 S Central Campus Drive, Room 3280
Salt Lake City, Utah 84112-9206
Telephone: (801) 581-6941
Fax: (801) 581-5281

In Table B, we give the revised values of the peak 1-g SARs where the SARs are now scaled up from Table 11 of the previous SAR Report, dated September 2, 1998, to a maximum possible conducted power of 28.8 dBm (759 mW), rather than the previously considered 27.8 dBm (600 mW).

Table B. The measured peak 1-g SARs for the Uniden Model DATA 2000 CDPD Modem for a maximum conducted power of 28.8 dBm (759 mW). The data is scaled from Table 11 of the previous SAR Compliance Test Report.

Antenna Tilt Angle	Peak 1-g SAR W/kg
0°	< 0.12*
45°	1.33
90°	1.04
135°	2.58
180°	4.16

* Too low to measure accurately

Since the SARs for antenna tilt angles larger than 90° are in excess of 1.6 W/kg, as before, we would recommend that the antenna not be used for full power RF transmission for angles larger than 90°. However, if the worst case duty cycle is less than 100 percent, angles larger than 90° position of the antenna may be used if it can be shown that the source/duty cycle-based SAR is still less than 1.6 W/kg.

The last point raised by Mr. Kwok Chan pertains to the estimation of separation distance required for users and nearby persons to be away from the antenna to meet the SAR limits. As pointed out in the previous SAR Test Report dated September 2, 1998, the main reason for higher SARs for antenna tilt angles larger than 90° is the increased proximity of the antenna to the nearest parts of the body, for example, the thigh for a laptop situation. Since the radiating helix-monopole antenna presently used for the DATA 2000 Modem is of length 5 cm (2"), a tilt angle of 135° (or an additional angle of 45° relative to the 90° tilt angle position) brings it a distance of approximately 0.7" closer to the body on an averaged basis. The thickness of the base of the laptop being on the order of 2" implies that a separation distance of 3"-4" from the radiating antenna would be sufficient to stay within the SAR limits.

Sincerely,

OM P. GANDHI
Professor and Chairman

OMP:wj