Mr Robert Paxman.
Intel Corporation,
Evening Creek Drive,
San Diego CA,
92128.

Date: 10th December 2004

Dear Mr. Paxman,

Please find attached details and responses to the questions received from the FCC. I have not as yet received the official CRN details for this query set.

if you have any questions please let me know.

Thanks,
Stuart Nicol.

1) In accordance with OET 65 Supplement C, please describe device transmitting setup and parameters for SAR tests.

The device was set to transmit using micro code supplied by the card manufacturer. The device was set to transmit at the predetermined frequency with the transmit power close to the manufacturers recommended level. When a specific channel cannot reach the recommended power setting, the closest available power level below saturation point is used.

2) Please explain how 95% duty factor used in SAR tests is established and is applicable for the device.

The 95% duty factor is set by the manufacturer and cannot be changed by APREL Laboratories, and is recorded in the test report for information purposes.

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3***) Please explain how 95% duty factor used in SAR tests is accounted for in SAR system, and explicitly carried through to determine final SAR values (e.g., include numerical example).***

The system determines the acquisition scheme used during measurement assessment by identifying the duty cycle setting as derived and inserted into the system by the user. The following table explains the sequences used by the system.

Duty Cycle Setting	System Averaging	Notes
1	1/1	CW
3	1/3	TDMA-iDEN
4	1/4 or 1/4.5	GPRS
8	1/8 or 1/8.3	GSM, DCS, PCS
10	1/10	Used for IEEE validation
Others from 11 onwards	% divisor	Treated as a CW signal but utilizes the user defined divisor. Used for research and systems with unusual modulation schemes.

Function: Reported SAR = Measured SAR-(Measured SAR/divisor)

The above process is currently being reviewed and revised, and may change in future software releases,

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4) Please explain why SAR was tested with lid/display closed, and how these results are applicable for any intended and expected use positions when display is open.

The device can be operated while the LCD is closed, and it is conceivable that the user can synchronize with a mail/server while transporting the device under their arm or in another position. Please see the attached paper for further descriptions of potential user scenarios. **This paper must not be made public.**

11) SAR report section 5 has for liquid target values:

body	***eps***	***sig***
2450	***52.5***	***1.78***
5200	***43***	***5.75***
5800	***48.2***	***6***

These numbers do not seem to be in accordance with OET 65 Suppl C:

body	***eps***	***sig***	
2450	***52.7***	***1.95***	
3000	***52***	***2.73***	
5200	***49***	***5.3***	***(interpolated)***
5800	***48.2***	***6***	

Please explain and/or revise target values, for this and all future filings.

APREL Laboratories use the recipe described within OET Supplement C for body simulation fluid used during the 2450MHz testing. The sigma value for the tissue at 2450MHz is within a 10% tolerance of the target values presented above. At this time IEEE 1528 does not have any coverage for body test situations and IEC 62209 part 2 has yet to be finalized. Current scientific studies lean towards a 10% tolerance for frequencies above 1GHz for both epsilon and sigma.

For frequencies above 3GHz no published data is available to the public for use in compliance testing, or compositions for human tissue simulation fluids and this led to APREL Laboratories developing tissues which are close to the recommended target values contained within supplement C. Extensive numerical research has shown that anatomical models yield close to 43% lower SAR when compared to the FCC homogeneous models (utilize dielectric target values) and any SAR deviation which may occur due to tissue manufacturing processes are deemed to be negligible due to the already over conservative means of the experimental measurement process.

APREL Laboratories have now reviewed the recipes used for SAR testing and through consultations new recipes have been developed to support measurements at 5.2 and 5.8GHz in line with FCC target values. The effective date for the above is November 3rd 2004.

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5) Several labs presently are routinely achieving liquid parameter measured values within typical IEEE Std 1528 tolerances. Please provide strong justification for liquid parameters used here. For highest reported SAR in this filing, please estimate, e.g., using Kuster/Balzano theory or FDTD, the expected SAR that would be obtained using Suppl C parameters.

APREL Laboratories are not concerned with the operations and activities of other laboratories or organizations, and request that the FCC not make reference to them within the correspondence for this application. APREL Laboratories would also like to point out that IEEE 1528 does not have any references to body SAR and feel that the above statement is inaccurate.

Presented below are numerical references derived from homogeneous compositions based on the FCC values for epsilon and sigma, along with the values for epsilon and sigma used for experimental tissues used by APREL Laboratories, and complex heterogeneous (anatomical models). All numerical problems were executed using Remcom XFDTD.

Tissue Type	Epsilon	Sigma	Frequency MHZ	1g SAR	10g SAR	Peak SAR
APREL	43	5.75	5200	58.8	17.7	240.2
FCC	49	5.3	5200	55.7	15.5	210.3
Anatomical	-	-	5200	34.1	11.38	-
APREL	48.2	6	5800	57.9	16.6	295.3
FCC	48.2	6	5800	55.8	15.2	230.1
Anatomical	-	-	5800	33.0	11.1	-

The data presented above shows that a complex anatomical model based on MRI/VH data at a resolution of 0.3mm yields significantly lower SAR values. It should be noted that these values are closer to the physical biological phenomenon. Deviations of SAR when comparing the FCC data for epsilon and sigma against the APREL tissue values for epsilon and sigma show that the deviation is within tolerance which is significantly lower than allowable deviations of 30%. It can also be shown that the tissues used by APREL Laboratories yield conservative SAR, and prove that a conservative mandate has been met.

Papers along with presentations have been submitted to IEC 62209 for consideration and use in the development of the part 2 standard. APREL Laboratories shall also present relevant papers to IEEE at symposiums next year.

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6) Please explain number and selection of channels used for SAR testing.

The selection of number/channels used within the SAR test process follow guidelines in IEEE-1528 and FCC supplement C (low, mid, and high). These channel numbers and the controlling methods are defined within the operational software for the card and this is the responsibility of the software designers to explain.

7) Please provide summary of actual area scan and zoom scan grid dimensions and step sizes used in SAR testing. Please include justifications if these differ from any draft IEC 62209-2 recommendations.

Area scan dimensions are included within the test report(s) data under the phantom data section however this value is recorded as 280mm by 200mm maximum scan area, but is reduced to 100 by 80mm after the peak SAR location has been identified. APREL Laboratories use a 4mm step resolution for "zoom" scan processes in all directions due to the axial isotropic response error for the E-020 probe being around 0.05dB. It has been found that this process allows FDTD derived target validation numbers to be achieved.

8) FYI SAR reports may contain some positions which do not correspond to normal or intended-use positions. FCC has reviewed all test results, but some positions may not be needed for future filings.

The positions alluded to within the test report reflect under side of the device with the LCD open and closed (lap position) side of the device open and closed (as the device could be transported while still operational).

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