8th April 2002

Mr. Robert Paxman
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FCC ID:- J3OWCB5000

Mr. Paxman,

Contained within this document are the answers to the questions from the FCC CRN22044 concerning the WCB5000 Wireless Ethernet Adapter. I shall address each question separately.

If you have any further questions please feel free to address them direct to me where I shall endeavour to answer them in a prompt and concise manor.

Sincerely,

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Question 1

Per reply to CRN 22044, please demonstrate that SAR was performed at 100mW.

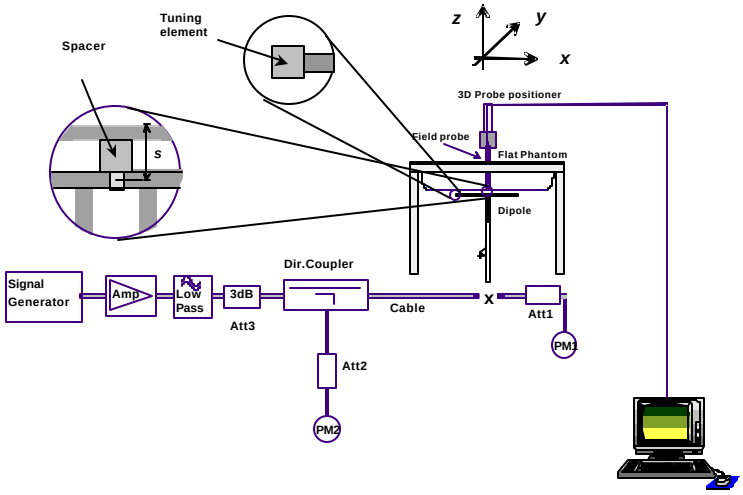
As per the specification of the manufacturer APREL can only test the device to the power, which has been pre, determined by the manufacturer. The details contained within the report in respect to the power requested from the device, and which was used during the analysis are per the manufacturers description.

Question 2

Demonstrate how 5.24 GHz dipole target SAR value was obtained.

IEEE P-1528 was used as a reference for parts of the design, manufacturing and characterization of the dipole. The dimensions for the dipole were determined using standard equations for estimating the mechanical length and height needed for a specific frequency tuned to the tissue, with the precise electrical characteristics. This was then verified by connecting the dipole to a VNA and at the predetermined distance of 10mm (taken from P-1528 and FCC OET 65 Supplement C Edition 01-01) from the tissue a series of S11 measurements were made to determine the return loss. Further trimming was then made to the length of the dipole to ensure that the optimum SWR and return loss was achieved for the specific frequency of 5.24 GHz.

The second stage of assessment in characterizing the dipole involved a course scan evaluation of the dipole using the ALIDX-500 SAR measurement system. This then located the position where the peak power was located. The diagram below represents (in part) the set-up used for the assessment of the dipole.



Note ** During this assessment no tuning element was used.

From the data obtained from the initial investigation, the X and Y locations for the peak power were then recorded and used for SAR peak assessments. The peak SAR was located directly above the feed point of the dipole. This initial exercise proved that the dipole was functioning as per the scope of the P-1528 standard. On the Z axis a number of predetermined steps were used to measure the SAR value. These values were then recorded and plotted to asses the decay of the measured SAR directly above the feed point of the dipole. A series of calculations were then ran to asses the drop off of the measured SAR. An extrapolation to the surface using the measured SAR values was then ran so as to calculate the peak SAR value at the surface of the phantom. Once this was finalized the reference values as assessed by the newly created procedure were recorded and used as a reference for further development.

The creation of this dipole and the method for assessment were part of a separate R&D project, which was initiated to support the WCB5000 project. Since the creation of this initial research project changes have been made, which have improved the overall methodology used to develop, manufacture and, characterize high frequency dipoles. APREL are currently developing a series of papers, which will be published and released at a latter date.

Question 3

Please submit probe certificate data, not just cal. cert. cover sheet. What is explicit equation for SAR from probe factor and measured voltage?

The Probe used for the assessment of the SAR for the WCB5000 project was part of the APREL R&D test equipment used during the development of the ALIDX-500 SAR measurement system. This probe has been calibrated at many differing frequencies and as such does not have a standard calibration period associated with all frequencies which are used for SAR testing. As a specific research project is initiated the process for evaluation, and calibration is then assessed and a decision made as to the acceptability of the results. A separate document with the specific calibration certificate for probe 154 associated with the WCB5000 project used for the SAR analysis has been attached to the email (P154 5GHz Cal.PDF). Subsequently the procedure and process used for the calibration for the E-010 probes has changed and APREL are slowly re-calibrating each one of the probes used for SAR assessment to meet the changes needed to comply with global standards (FCC included). This is a lengthy and costly process and cannot be implemented over night. Some of the methodology used is proprietary and as such APREL are trying to maintain our intellectual property until we complete the production of all methodologies and publish the associated paper(s). It is anticipated that upon completion of this research we will release all papers primarily to IEEE SCC34 (P-1528 working group) and IEC TC106.

Note ** Probe 154 was recently withdrawn from SAR assessments at the start of April as the result of damage caused during a research project. The technician who executed the calibration of probe 154 has recently left APREL.

Question 4

Please submit tissue liquid ingredients and mixture percentages.

A separate research project was initiated by APREL to develop a tissue for use in SAR assessments at 5.24 GHz.

I spoke with a member of the OET Engineering staff back in August/September of last year in respect to the 802.11a project which I was working on (WCB5000). From my notes I see that I had asked for the advice from the engineer about the tissue parameters, which I would be using for the 5.24 GHz tissue recipe. One of the conclusions, which I noted, was to derive the values for epsilon and sigma at 5.24 GHz using the values presented in OET Sup C for 3 GHz and 5.8 GHz. I then used interpolation to identify the values for sigma and epsilon at 5.24 GHz for body.

APREL started to research a number of materials (sugar, water etc..) used for the creation of the tissue. Over a period of 4 weeks we looked at solvent and sugar/water based materials. The outcome of this research being the most stable material for use in the recipe was sugar water.

The following is the ingredients by percentage, which is used in the mixture of the 5.24 GHz body tissue.

Sugar	36%
Water	53.9%
HEC	0.1%

Note ** We could not use PD7 as it caused the conductivity to become unstable over a short period.