

IrvinePHY Subgroup Activity Summary

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At the Plenary meeting of IEEE 802.11 held in Irvine during the week of March 9,1992 the PHY subgroup met to work on channel characterization and to determine a plan of action for arriving at a PHY standard.

The first meeting was held Monday morning and was attended by 24 people. The contributions that would be presented during the week were discussed briefly and a decision was reached to review contributions on Wednesday morning.

Our attention turned to channel characterization and we discussed a proposal by Rich Lee that we send a letter to organizations likely to be in possession of measurement data stating the data we are looking for to form an accurate model and to solicit their input of data into the standardization process. This data would need to be in some agreed upon file format so that it could be useful. The idea here is that if we describe in detail how the data is to be processed and process all data uniformly, a more complete picture can be drawn of the range of environments in which wireless LANs must operate.

We discussed briefly what set of test signals might be used for conformance testing. Here the discussion centered around whether a large reference set of measured impulse responses should be used or a model. It was pointed out that a deterministically seeded model would yield deterministic results and provide the advantage that it would be easy to modify the seeding to provide more exhaustive tests.

We next discussed the need to characterize interferers and the question of how to allow for "co-habitation" of FH and DSSS systems within the same band. In order to effectively characterize interference it is necessary to first select the frequency band that you are characterizing. A straw poll was taken showing near unanimous approval for concentrating initially on the 2.4 GHz ISM band. In order to assure that this was the consensus of all 802.11 this motion was brought to the plenary on Tuesday morning. It was also concluded that if we are operating in an ISM band we have no choice but to "co-habitate" with diverse systems and so our work should have as an underlying assumption that we will need to operate in this environment. This makes the question of "co-habitation" of possible FH and DSSS IEEE802.11 LANs moot, and

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reduces the question of whether both should be supported by the standard to one of whether the support of both is desirable or undesirable from an overall market acceptance point of view.

As an aside, the motion brought to the plenary read as follows:

**The PHY group requests consensus of the IEEE 802.11 Plenary to concentrate our initial work (in the RF area) on the 2.4 GHz ISM band. This is consensus for initial work. It does not preclude a change if regulations change and it does not preclude work on an IR PHY. It also does not preclude work on other available bands.**

#### Justification

##### Advantages

- 1) This is the band with the widest global availability.
- 2) There is 83.5 MHz available and this is felt to be enough to allow useable implementations.
- 3) RF component cost are at the threshold of what can be considered "low cost" at the is frequency.
- 4) It is felt that adequate in buiding range will be achievable.
- 5) The jamming and interference profile is relatively well known (under current usage conditions).

##### Disadvantages

We need an authoritative report certifying "state-of-the-art" information on the potential for biological hazards in this or any other frequency band in which we choose to operate.

This motion passed 35 For, 1 Against, 2 Abstain.

This concluded the activities for Monday morning.

The next meeting of the subgroup was held Wednesday March 11,1992. Presentations were given of the papers, Submission 92/27 dealt with the mathematical basis for using wideband measurement techniques to provide complex impulse response data and provided a specific method for extracting statistics from such a measurement. Submission 92/30 provided information regarding characterization of IR channels and other medium characteristics. Finally, submission number 92/38 provided information regarding specific wideband measurements taken by NTIA.

Discussion on how we would actually conformance test implementations then took place. The difficulty associated with removing the impact of the test room from the conformance test process was discussed. There were suggestions that an anechoic chamber or and open field might be required. There were also suggestions that the impact of the test environment might be

removed through calibration, much as a network analyzer removes the impact of variations in test jigs from the test of a device. The question of whether direct connect to the antennae port would be a sufficient test was also raised. The issue was left for further consideration.

After a break for lunch a discussion of what we would like to see in new tests, should they be done took place. The basic measurements that we believe are missing from the literature are:

- 1) Measurements with one node moving.
- 2) Measurements specifically targeted at determining whether delay spread is impacted by the separation distance between transmitter and receiver (Euclidean or attenuation)
- 3) Whether the fact that devices may operate in each other's near field will have an impact on channel impulse response.

There was a discussion on item 2 above with some members of the group contending strongly that delay spread would increase with distance and others contending that distance did not have an impact. Data from contribution 92/38 that plots this is one example of the type of measurement information necessary to resolve this question.

We next addressed how to proceed in order to achieve a standard. It was discussed that perhaps two subgroups, one dealing with channel characterization and conformance testing and one dealing with the task of writing a "prototype" standard and addressing the issues of "co-habitation" and tradeoffs between modulation methods might be a possible approach. We will keep this as a potential method for proceeding but will not implement it before the next meeting.

For the next meeting we need a specific useable channel model from which to begin our work. Volunteers to submit were solicited.

- 1) Kiwi Smit and Dick Walvis volunteered to provide a submission and to have it on the bulletin board 1-800-348-0211 by 4/11 and to submit to the group in Lieden
- 2) Others are welcome to submit.

We also wish to proceed on a prototype draft standard with the first major activity being analysis of the tradeoffs between FH spread spectrum systems, DS spread spectrum systems, and narrowband systems. In particular this involves analysis of immunity to interferers and ability to co-habitate spectrum.

- 1) One volunteer has offered to provide input regarding FH spread spectrum if he can get management approval for his work.
- 2) Others are welcome to submit.

