

## IEEE 802.11

## IR-PHY Sub Committee Meeting

**Title:** IR-PHY Sub Committee Meeting,  
Oshawa, Ontario

**Date:** May 10 -12, 1994

**Chairman:** Roger Samdahl  
Photonics Corporation

**Secretary:** Barry A. Dobyns  
Photonics Corporation

This document constitutes the minutes of the IR PHY meetings held May 10 to 12, 1994 in Oshawa Ontario. Roger Samdahl, Photonics Corporation chaired the subcommittee. Subcommittee members in attendance were:

<u>NAME</u>	<u>E-Mail</u>	<u>Fax</u>
Roger Samdahl	70110.360@compuserve.com	408 955 7950
Francisco Lopez-Hernandez	dxtn@tfo.upm.es	34 3367319
Manuel J. Betancor	betancor@tobos.ulpgc.es	34 28 4512 43
Barry Dobyns	76527.266@compuserve.com	408 955 7950
Hirohisa Wakai	wakai@sharp.co.jp	510 644 1126
Orest Storoshchuk		905 644 2839
Rui Valadas	rv@ua.pt	351 34 381937
Kamilo Feher		916 752 8428
Bob Buas	buaas@nosc.mil	714 968 6781
Doug Prendergast		613 738 1772
Helmut Kindl		49-89-41443003

The minutes to the meeting are presented in a 'dialogue' style. This is not an exact transcript, and many comments may not have been captured accurately, or have been edited, thereby improving or destroying the grammar. Comments of the secretary are presented inside <angle brackets>.

**Morning Meeting May 10, 1994**

Roger (9:00 am) Start meeting. Read agenda.  
\* Decide values for PHY frame size and MPDU size  
\* Edit (start) draft PHY standard  
\* Resolve clear channel assessment issues  
\* Resolve PHY layer control headers  
\* Respond to questions from MAC group  
Roll call

Kamilo This week we need to decide on one baseband and one modulated standard.

Roger Yes, that is an objective of this week  
Are there any comments on the minutes of the last meeting

Kamilo Wish there was a list of names on the minutes  
Move to accept the minutes

Bob Second

Vote 11-0-0

Roger We have papers 95 (Rui), 96 (Rui), 97 (Rui), 118 (Kindl), 125 (Kamilo), 126A (KC)  
Propose that we read KC's paper into the minutes.  
As a result of the meeting last time we agreed to limit our encoding techniques to the list  
<<insert list>>  
\* Need to select one baseband and one carrier type PHY  
\* prepare resolution for the full PHY group

Kamilo When do we meet again as the complete PHY?

Roger Not this afternoon. Probably tomorrow afternoon.

Kamilo We must choose the bit rate. Last time we chose Exirlan, that was voted in, and a choice of bit rates. We should reduce bit rate to one chosen rate, or maybe two. I don't think that it could pass the larger group with so many bit rates.

Roger That's reasonable

Barry We need to make sure that the MAC and the larger PHY does not preclude the development of PHYs that vary in bitrate over one or two orders of magnitude. This is a much harder job than PHYs that vary over a power of two.

Kamilo KC Chen suggested that we talk about this

Roger Other changes for the agenda

Kamilo Somehow limit the presentations so we can get to the discussions right away. Let's try to wrap up the technical presentations by lunch.

Roger That's reasonable

Kamilo Maybe we can meet this evening

Roger I'd rather keep this evening free. We have tomorrow. We need to be able to meet tomorrow afternoon with the full PHY to present our resolutions for approval there.

Rui (Presentation of 94/95, 94/96, 94/97)

- Doug Doesn't the ambient noise level limit your performance even in the presence of a more sensitive receiver?
- Rui Sectored receivers, like we presented last time solve this.
- Roger I think that more sensitive receivers will never get through in the presence of the less sophisticated receivers.
- Doug You need some sort of adaptive sensitivity control.
- Rui What I am trying to do is to allow conformance in the standard to be not just for a narrow range of sensitivity, but for a higher range. In a single BSS, with only one AP, there is no problem with higher sensitivity stations, in fact the system may benefit. The problem is with multiple AP, multiple BSS.
- Kindl You will overcome lamp problem with blocking sensitivity in some directions, but you require fixed radiated power. Doesn't blocking the emitter cause problems? In other words, the shade for the receiver will reduce your output power.
- Barry We use separate antennas for receive and transmit
- Roger We electronically turn off some receivers, we don't physically shade it.
- Kindl What is the duty cycle for the transmitter ?
- 25% in the 4-PPM case -
- Rui We'll determine the maximum frame length here.
- Roger The duty cycle is 50% in the preamble
- Kamilo I understand that the bandwidth for the transmitter and receiver in your proposal is the same for 1 MBPS and 2 MBPS?
- Rui It's about 4 MHz.
- Kamilo How do you define bandwidth?
- Rui We use a shaping filter so it's hard to define, we get about 3 dB from the filter
- Kamilo I'm concerned that we have not infringed on the Exirlan proposal.
- Roger Already agreed to reserve 0 - 5 for baseband
- Rui We specify a density of radiated power , and manufacturers can decide on the amount of active area and sensitivity per active area.
- Kamilo I believe that your conclusion is right, but did you take into account the receiver noise sensitivity?
- Rui We have normalised bit rate, noise and all the other factors except for irradiance and required sensitivity.
- Kindl Averaged over what
- Rui In this calculation is for continuous operation not for a burst.
- Kamilo Took into account for 16 PPM needs more bandwidth than 4-PPM and that it will require more than PSK?
- Rui Yes. You are using narrow pulses, required average power for 16 PPM is lower.
- Kamilo If you have a certain amount of noise, then if I compare 16 PPM against PSK at the same bitrate then PSK has less bandwidth
- Rui I took that into account

Doug I want the S/N ratio for the other modulations schemes - I know for PSK

Rui Those numbers are embedded here, but I don't know them here.  
We're basically re-using the fiber optic results here.

Kamilo BER is a function of dB/no

Rui In a baseband scheme the normal method is to present BER directly.

Francisco This issue is not important - you want an isotropic coverage

Rui The issue is what is the best way to get that isotropic coverage. Pointing at the same ceiling or pointing in different directions.

Francisco Why is this important

Rui Because of the hidden station, if you allow a station with all LED pointing at the ceiling to interoperate with a station which has LED pointing at the corner is the same as having different power specifications.

Kindl

Rui What I want to see is some bounds on density transmitter can produce in certain directions.

Kindl Is the solution different for different environments?

Francisco Total power for emitter for a certain angle should be sufficient to specify.

Rui This does vary with the reflectance coefficient of the walls and so on. What I am trying to do is to narrow the specification of the emitter beam in such a way that conformant machines will have similar emitted power.

Barry Want to reduce the variance between emitters

Doug This becomes a specification for the manufacturer.

Rui Radiation profile of the emitter, which is composed of several LEDs is as important as the total radiated power.

Francisco It is not necessary to define the total angular profile of the emitted beam. It is sufficient to specify that, say, 3/4 of the transmitted power is within a certain angle.

Rui We are now talking about the specification technique for the specification.

Kindl How can you achieve the goal with a specific standardised radiation pattern? How do you know what the optimum pattern is?

Roger I will be interested to see what Rui has for an optimum pattern. Beyond that, there must be a standard pattern, and I agree with that. We have a product that uses a narrow cone pointing at the ceiling, and have modelled a more sharply pointing model which is subject to blockage from people walking in the room.

Manuel This is not really diffuse if you are specifying where to focus the LEDs.

Kindl You need a donut for the football field, and a ball for the room.,

Barry We'll sell an optimum room to use with the optimum emitter

Rui It's no good to point all the LED's at the ceiling. I will open the beam, but there must be a tight specification

Manuel With full diffuse you can get 5 MHz of bandwidth.

Rui I don't understand your point.

Manuel Your bandwidth is 4 MHz

- Rui There is no problem with multipath at our bandwidths.
- Kamilo I am trying to summarise 4-PPM, 16 PPM. With 4-PPM you can go faster 2 MBPS. 4-PPM requires more average power, but more throughput. If we could get more average power through diodes. What do you recommend
- Barry It depends greatly on the user model. If the user is using a "traditional" LAN application, the application will frequently access the network and will drain the batteries in no time. New applications may use less of the network and may be able to achieve better power performance at a higher bit rate.
- 10:45 - 11:00 Break
- Rui < Continuing presentation >
- Barry I'm concerned that your PHY header does not look like Ed Geiger's PLCP header
- Kamilo This could be modified to make it the same for baseband and modulated.
- Barry If we adopt the PLCP header, we can drop the end-of-frame delimiter.
- Roger The other PHYs are processing the entire frame and giving an indication on the goodness of the entire frame.
- Francisco So your PHY does not process the data load
- Rui Right, only the PHY header and EFD are processed by the PHY.
- Roger However, any modulation or encoding error causes the end-of-frame processing. It is processed as if the EFD was received.
- Barry It causes the PHY to drop PHY\_RXBUSY, in the current nomenclature.
- Barry These frame error rates are for what size frame
- Rui 512 octets, as specified in the PAR.
- Roger That's a surprising result (the bit error rate contributions by type of error).
- Bob That's because the SFD is so small. Phase synchronisation is the problem here because the SFD is right up against the clock.
- Bob You felt strongly about the preamble being a clock, rather than a barker code, which requires a decoder, but gives better discrimination.
- Rui I have not looked at that but our main purpose is to synchronise a PLL with the preamble.
- Roger (EFD) I disagree with your analysis that you have to take 31 slots
- Rui You need to drop PHY\_RXBUSY at the right time so that the MAC can time the IFG correctly.
- Roger Is it important to recover the EFD if I have an error in decoding in the middle of the packet.
- Rui We are hoping that the case of receiving without errors will be the most frequent. By using an EFD we can do this indication faster. I think the EFD can be counted in overhead. My goal was to reduce the PHY overhead at the end of the frame.
- Barry One of the things that we will need to ultimately specify to the MAC is the error tolerance in our indications of PHY\_RXBUSY. Right now the MAC is under the mistaken assumption that all indications will be absolutely bit-synchronous.
- Rui The RX - TX turnaround and TX - RX turn-around times are not specified
- Barry Didn't we specify that in our proposal
- Barry We need to include antenna switch time and antenna diversity count, for your sectored receiver.

Kindl           you specify 10dbm/cm<sup>2</sup> light: what kind of light is this

Roger           This is in-band DC light.

Rui             In this graph (FER versus MAC Frame Length) the legend is reversed (4PPM line is solid, 16PPM line is dotted)

Kindl           <Presentation of 118>

                  There is a print error on page 6, table 1, in SFH 677 should read SFH 477

Francisco       It looks very linear

Kindl           It is over this decade 100ma to 1A

                  Can make the beam width whatever you like based on how deep you put the die in the package. The device on last page is the same (as SFH 477) in a non-lensed package and is near Lambertian.

Roger           Talk about power dissipation for 1A usage.

Kindl           Don't go beyond 2 amps or you will damage the bond wire.

Roger           What is the time constant for the die?

Kindl           On the order of 10's of microseconds?

Rui             So can I use only one LED?

Kindl           At 25% duty cycle you can get about 250 mW, you'll need more than one lamp to get your 2 W of output power.

Barry           Unless you want to use them as flashbulbs and replace them all the time.

Kamilo          Do you have 20Mhz or 30Mhz diodes?

Kindl           Not yet, but we have devices in the 10ns range in the labs now. The SFH 495 has an even lower switching time but cannot run in the DC mode.

Kamilo          How about the photodiodes? Are they linear?

Kindl           If you properly bias it, it is linear over about three decades of optical power.

Kindl           The SFH 495 is in lab samples now.

<ALL>           Put the charts in the record as 118A

Kindl           The SFH 477 and SFH 495 are particularly useful for baseband, and the SFH 477 and F237A are particularly useful for carrier modulations.

Kindl           We'll be having good emitters in 1.3 soon.

Francisco       Is the air transparent at 1.3 nm

Kindl           Yes, it's transparent up to about 2.5 nm

Francisco       You get more electrons per watt

Kindl           But you cannot use silicon for your detector.

Roger           Adjourn for lunch

12:45 PM

**Afternoon Meeting May 10, 1994**

Roger 1:45 PM Call to order

Kamilo Yield to KC Chen's Paper

Roger <begins to reads KC's Paper 94/126>

Rui Is it acceptable to present and discuss a paper which is not reproduced and available

Roger It will be reproduced.

Rui It will be hard to follow without transparencies or written copies

Roger I will defer this paper until tomorrow morning when copies will be available.

Kamilo Presentation of 94/125

1.3 IR Wavelength should read 850 to 950 nm

1.4, 1.6 - 1.8, 3.3, 3.4 delete

4.1 should read 15-30 MHz

Section 6 not complete

Kamilo In principle I would agree have, say 1Mbps in baseband and, say 4Mbps in carrier modulated

Roger I think it's important that the template documents represent actual hardware we will build. I propose that we devise two templates, one for baseband and one for carrier modulation.

Kamilo I think that this is a bad idea because of the experience in DS and FH.

Bob This is a problem because of the small size of our group

Rui These are two completely different PHY's. Frame format for FQPSK is very different than PPM. Every entry will be different in the template

Kamilo It is my intention that the preamble will be in baseband and the template entries will be different.

Francisco This is necessary in the coexistence band.

Barry Baseband preamble limits your ability to channelize the non-coexistence band.

Roger If you use a baseband preamble and postamble you can no longer share the medium.

<everyone> <Much noise>

Kamilo I was referring to all these bits in the frame header are coming as NRZ bits.

Roger <Drawing Example on whiteboard>

In a single channel, wired, medium only one unit can send at a time.

Channelized systems allow different units in different families, or even the same family to transmit overlapping frames.

If the preamble is baseband, then when unit 2 turns on, unit 1's transmission is walked on.

Kamilo I disagree, we only TDMA the preamble, not the whole frame.

We agreed to share the medium - this does not mean two separate PHY to me.

Roger No, the goal is to pick two modulation schemes and develop two templates.

Doug If there are two templates, then what is the problem?

Kamilo We must be careful to make sure we craft prose which will allow it to pass.

- Roger I do not believe that a PHY can be written which will allow both high-band and low-band operation  
<Larry enters room>
- Kamilo <Recaps>  
Should we come out with two PHYs or one integrated PHY
- Larry 802.3 asks "Does it cover a different constituency?"  
I would argue that it does. If they can coexist in the same geography, then it's not that different than 900Mhz vs. 1.2Ghz or DS vs FH. Then they should be two different PHYs.
- Bob Are we sure that these two PHYs can in fact co-exist?
- Barry I don't know - nobody here has built both.
- Roger The concern is the baseband component of the carrier based system would interfere.
- Kamilo <lost comments>
- Vic Hayes Must meet the five criteria - I'll look to see if I have a copy.  
<group> explains to Vic
- Vic Clearly two or more PHYs.
- Barry Move:  
That the IR PHY Subcommittee produce two PHY definitions, one for baseband operation from DC to MHz, and one for carrier modulated operation from 15Mhz to 30Mhz, subject to the provability of the mutual non-interference of the two PHY definitions, and reserving a coexistence band from 5Mhz to 15Mhz.
- Bob Second
- Doug I don't like the wording "mutual non-interference"
- Barry What we're saying that is that the spirit is that both systems can co-exist in the same room without having to time multiplex.  
In other words, the signal for one is below the S/N ratio for the other.
- Vote 8-0-0
- Bob We should just adopt the templates on the table
- Roger First we must choose the specific modulation schemes.

**Afternoon Break**

The Five Criteria, referred to by Larry and VIC are summarised:

1. Broad Market Potential: All standards authorised by the 802 shall have a broad market potential.
2. Compatibility: All standards shall be in conformance with the IEEE 802.1 Architecture, Management and Internetworking.
3. Distinct Identity: Substantially different, one unique solution per problem, easy for the document reader to select the relevant specification.
4. Technical Feasibility: The project shall show Demonstrated system feasibility, proven technology and reasonable testing, confidence in reliability
5. Economic Feasibility: The project shall show known cost factors, reasonable cost for performance, consideration of installation costs.

**Afternoon Meeting, 3:30pm May 10, 1994**



Roger Call to order

Bob Moved: IR PHY adopt FQPSK as modulation format for Carrier modulated IR Communications.

Manuel Second

Vote 7-0-1

Roger We need to construct the template for the modulated carrier to separate out baseband.

Kamilo There are many other things to work out.

Roger There is so much similarity between what Rui has proposed and what I have proposed before that they are substantially the same. We should support Rui's proposal

Barry Move

That the IR PHY Subcommittee adopt as it's baseband encoding technique, 16-PPM for the 1Mbps bitrate, and 4-PPM for the 2MBps bitrate.

Francisco Second

Rui Friendly Amendment to read:

That the IR PHY Subcommittee adopt as it's baseband encoding technique, 16-PPM for the 1Mbps bitrate, and 4-PPM for the 2MBps bitrate, with all conforming receivers required to operate at both bitrates, and all conforming transmitters required to operate at the 1Mbps bitrate.

Doug This does not prohibit operation at 2MBps

Barry no

Vote 7-0-1

Bob Move

That the IR PHY Subcommittee has specifically rejected all other proposals for carrier modulation and baseband encoding.

Rui Second

Barry What we intend is to limit is the proposals we intend to turn into a standard for November. We may choose to later do a 10Mbps baseband encoding that will use the coexistence band, and it won't be 16-PPM.

Vote 8-0-0

Kamilo It is understood that the carrier modulation will be able to handle 1, 2, 4, 10, pending further technical investigation.

Roger We must make a decision this week on these basic things otherwise we cannot craft the prose in time.

Kamilo I feel it should be 1Mbps and 4Mbps.

Barry Go for 4 and 10

Doug 1 and 2 will be defeated

Roger It must be clearly different. This is the only chance we have

Kamilo How about 1, 4, 10

Doug There's a redder

Kamilo Motion  
The carrier modulated system will be capable to operate at 4Mbps and 10MBps.

Bob Second

Barry Is there a power penalty for 10Mbps

Kamilo There's the EB/N penalty.

Bob Move to call

Rui Second

Vote 8-0-0

Vote on motion 8-0-0

Barry I propose that we adopt a current document that's already written as our draft standard for two PHYs

Bob How about adopting 94/50r1

Barry How about Rui's documents presented here.

Roger We need to make sure that we connect to the right place in the MAC - we're a cut maybe several below where the other PHY's come in

Bob I disagree that we need to do all that stuff

Rui Do we need a template as well as a draft standard?

Roger I'll ask Larry and Vic if we need a template

Rui I'll volunteer to edit the baseband draft standard

Barry I'll assist with baseband.

Kamilo For modulated carrier systems, Peter Blomeyer and I will edit.

Roger I accept these volunteers.

Kamilo We will take Rui's document as the working document for the initial draft  
Likewise for modulated we accept my  
Move  
We adopt 94/95 as the draft template for the Baseband IR PHY.

Barry Second

Roger We may find out we do not need a template.

Barry We now have something we can present to the entire PHY as a first draft this week.

Kamilo I'll produce such a document based on my 94/125

Rui I just need to change the title of mine to insert the word "Baseband"

Roger I'll get document numbers

Bob They need to look the same

Roger Let's talk about what we'll do in the morning. I am uncomfortable about what we're doing - we don't have a PLCP header and so forth. We may need a convergence layer.

Bob Let's not do it if we don't need to.

Bob (informal) Move  
We can support any frame length the MAC wants

Barry We must tell the MAC. Some MACs will want to do 16K octets

Roger From experience I know that we cannot do 16K octets.

Rui I have not recommended a specific frame length

Bob What size would you recommend based on experience

Barry We send 1600 octet frames now

Roger But the long ones fail first.

Barry I recommend 2K octets

Roger So you can send entire Ethernet packets as encapsulated data.

Barry I recommend you should offer a motion at 2K octets

Kamilo If you have 16000 bits, to get a frame error rate of 10<sup>-5</sup>, we can't do it. It's very hard to meet this specification

Francisco Should have small packets because of thermal cooling problems

Kamilo In the first go round don't go so far.

Rui The issue is throughput.

Bob Motion  
That the IR medium appears to accommodate frames of 16 kilobits in length and the IR PHY subcommittee proposed this as an upper limit for the consideration of the entire PHY and PHY-MAC subcommittees.

Barry Amended to read  
Reference P.802.11-94/92r, Page 2, Frame 3: It is the intention of the IR PHY Subcommittee to develop standards for PHYs which can deliver frames whose maximum size is on the order of 2000 octets including PHY-specific overhead.

Barry Second

Vote 8-0-0

Roger Adjourn

**Morning of May 11, 1994 9:00 am**

Roger Call to order  
<To Larry vdj> Do we need to generate a formal template, or can we go directly to a formal document?

Larry That's strictly up to you. Somehow you need a way to track the numbers. If it helps you.

Roger What do we need to produce? Can we use 94/50 or 94/68 as a starting point for us.

- Larry This is the situation as I see it. There is a working rough draft for a full standard. There is a working set of MAC-PHY primitives. and we should stick to section seven in 94/20b0. Unfortunately, some people are working on implementations and are not thinking about what will expedite their own internal agenda. They have created a more specific interface for their own needs. At the Section 2 - 2.5 of DS and FH spec (of 94/50 and 94/68) will be pulled out and negotiated in the MAC-PHY plenary. Sections 2.6, 2.7 2.8 are management primitives and need to go to section 10 of 20b0.
- ?? Who are the editors of these documents  
20b0 Bob O'Hara, Jim Schussler, Greg Ennis  
94/68 Ed Geiger, Dean Kawaguchi, Tim Blaney  
94/50 Paul Struhsaker
- Larry So we have a problem. We should use 92/4 as a template.  
Let me talk about PHY Primitives  
You can't use document 50 - this is definitely screwed up. 2.5.? is wrong.  
The concept of an abstract service interface is that what you try to do is that a PHY\_DATA.REQUEST (Class, Data) as in b20, you come up with this list of things like length, transmit power, the sequence of events is  
PHY\_DATA.Request class=start-of-activity, data=(antenna, etc)  
PHY\_DATA.Request class=parameter-information, data=whatever  
PHY\_DATA.Request class=data, data=mpdu  
This happens (class=data) on an octet by octet basis, and the PHY and MAC can exchange parameter information on a octet by octet basis.  
I believe there is no other standard that has a frame level MAC-PHY abstract interface.  
Within the abstract model, you do not need to have the same primitive parameters across all PHYs
- Roger How does a manufacturer turn this into a system
- Larry This is not an exposed interface. It has nothing to do with a implementation. Typically if you get the source for a LLC layer you'll see these names in the actual routines and variables.  
If people would go do a tutorial on the ISO reference model, this is basically a way to use our stuff with other
- Roger This is in 92/4
- Larry No, 92/4 is mostly about jitter and waveforms and so forth.  
The PLCP describes what you'll put on the packet. The PMD section describes the waveforms, the dynamic range and so forth. There is also a layer management interface. Sometimes just counters of errors and such. The MAC-supported MPDU size is usually a PHY-managed value passed through layer management. 802.1 charged use GDMO (Guidelines for Definitions of Managed Objects), as described in ISO/IEC 10165-4 1992, also 802.1f charges us with layer management and GDMO.
- Roger We can describe this with little difficulty, but how do we converge with the other PHYs and MAC

Larry We had stuff and voted on it, but the editors are working on new stuff.  
PHY\_DATA.Request class=start-of-activity  
Phy\_data.confirm (PHY-MAC) status  
PHY\_DATA.REQUEST class=data (octet by octet)  
Phy\_data.confirm  
...

IR should say "We went to 94/b20, which has already been voted upon, and found the primitives there, and started to write our specification based on the primitives in 94/b20"

Barry Does our PLCP header need to look like the other ones?

Larry No.

Rui Why do they have a length in the header?

Larry In lieu of a good end delimiter

Rui But why does it get passed to the MAC?

Barry Does the length in PLCP prevent you from having a single bit error cause a invalid indication?

Larry The project 802 functional requirements says we need to be able to have a hamming distance of 4 with respect to the SFD and EFD, and that can be implemented by some kind of stuffing, and a CRC-protected length attempts to do this.

Rui If you have an identification field, if there is an imitation of the SFD in the header, the

Barry The CRC-protected PLCP header is an elaborate SFD and EFD for the MPDU data load, which guarantees a hamming distance of four on the MPDU SFD and EFD.

Larry You can do your own SFD and EFD, as long as you have a hamming distance of 4 or better, or you can do what they do.

Kamilo This is a big job

Roger If we don't get working on a document we can't get done by November. I assumed we could copy 94/50 or 94/68.

Larry That's not what you should copy.  
You can definitely start writing the PMD.

Larry MAC needs CCA

Barry But what does CCA do? Shouldn't the MAC know what kind of CCA we get, energy detect or qualified SFD and good bits?

Larry The primitives don't really allow for that, unless the PHY\_RXBUSY and PHY\_CS meet that requirement.

<group> What should we be doing

Larry Certainly the PMD work can proceed independent of the other work.  
<Larry left>

Kamilo We should keep the templates around.

Barry We should put the template in the written standard, it is a valuable intellectual tool that should be included in the standard to make it easier to interpret.

Kamilo I agree

Rui I agree

Roger           The template is essentially a short-form of the PMD. I agree that it would be helpful to include in the standard.

10:30 a        <Break>

Roger  
11:00 a        Call to order

Kamilo         Called Blomeyer, and he agreed to help in the editing.

Roger           <presentation of P802.11-94/130>

               My intention is that we approve this both as a format and a standard. This is a working document, much as 93/190 became the working document for the MAC.

Bob            Motion:

               That the IR PHY accept P802.11-94/130 as the working template for the BASEBAND IR Physical Layer specification.

Barry          second

Vote          6-0-0

Roger           <presentation of P802.11-94/131>

               My intention is that we approve this both as a format and a standard. This is a working document, much as 93/190 became the working document for the MAC.

Bob            Motion:

               That the IR PHY accept P802.11-94/131 as the working template for the Modulated IR Physical Layer specification.

Barry          second

Kamilo         This is less complete than 94/130, and will require some additional work. There might be some errors as well.

Bob            Certainly the data from Kamilo's document 94/125, sections 4 and 5, is captured correctly here.

Kamilo         In the interest of uniformity, I note that Rui used the term SLOT where I used BIT. Actually my document 94/125 is more descriptive than this.

Vote          8-0-0

Roger          We should talk about compatibility between the various modes. Are there any other action items

Kamilo         What about CCA?

- Barry Resolved:
- That the IR PHY Subcommittee can provide CCA like functionality in three categories:
- 1) Energy Detection
  - 2) Like PHY Detection
  - 3) Bit Recovery
- And the IR PHY requests of the MAC-PHY interface Subcommittee and the MAC subcommittee that the CCA functionality which will ultimately be required of any PHY fall into one or more of these categories.
- We can further advise the MAC-PHY Interface Subcommittee and the MAC Subcommittee regarding the timeliness and quality of each of these, to wit:
- 1) Energy Detection is available earliest and is of lowest quality
  - 2) Like PHY Detection is available many microseconds after energy detection and is of better quality
  - 3) Bit Recovery is available many microseconds after Like PHY Detection, at the end of the PLCP header, and is of best quality.
- Barry Type 2 is intermediate in quality between 1 and 3, in that you believe that type 2 is a PHY of your type because you can detect the preamble (baseband) or lock on to the carrier (modulated), but may not be able to recover bits (because range or noise problems).
- Rui Does the MAC need all of these?
- Roger The MAC has talked about each of these but may not understand the distinction.
- Rui In the case of the baseband
- Bob Second
- vote 8-0-0
- Barry Motion
- That the IR PHY Subcommittee directs the editing teams of the two PHYs to produce and distribute their draft standards, including the templates, to the members of this subcommittee by FAX or E-Mail no less than seven days before the next meeting of this body.
- Barry This is so that we can read it beforehand and not try to read the documents and make action in the same meeting, but can come prepared.
- Kamilo Second
- Vote 8-0-0
- Hirohisa Is the main purpose of the Liaison with IEC band allocation, and the main purpose of Liaison with IRDA non-interference
- Roger Yes, that's true.
- I believe that our PHYs will run in the presence of IRDA signals without interference.
- Bob What is IRDA?
- Roger & Barry Infrared Device Association
- It's a low speed point-and-shoot 1 meter and 3 meter specification. It does not allow MAC layer addressing, there's no MAC in fact. It's a UART style octet oriented interface.
- Roger <Adjourn>

