

## Unconfirmed Minutes - Multiple MCS IEEE 802.3bn EPoC Ad Hoc – 050213

### Attendance

Attendee	Present
Alan Brown – Aurora	
Andre Lessard – CommScope	
Andrea Garavaglia – Qualcomm	
Avi Kliger – Broadcom	
Bill Keasler – Ikanos	x
Bill Powell – ALU	x
Charaf Hanna – ST Micro	
Christian Pietsch – Qualcomm	
Curtis Knittle – CableLabs	
Dave Barr – Entropic	
Dave Urban – Comcast	
David Law – HP	
Duane Remein – Huawei	x
Dylan Ko – Qualcomm	
Ed Boyd – Broadcom	x
Ed Mallette – Brighthouse	
Eugene Dai – Cox	
George Hart – Rogers	
Guansheng Lu – Huawei	
Haleema Mehmood - Huawei	x
Hesham ElBakoury – Huawei	x
Jim Farmer – Aurora	
Joe Solomon – Comcast	x
John Dickinson – Brighthouse	
John Ulm – Motorola	
Jorge Salinger – Comcast	
Juergen Seidenberg – BK Tel	
Juan Montojo – Qualcomm	
Leo Montreuil – Broadcom	
Liuming Lu – B-Star	
Lup Ng – Cortina	
Marc Werner - Qualcomm	
Marek Hajduczenia – ZTE	
Mark Laubach – Broadcom	x
Matt Schmitt – CableLabs	
Michael Peters – Sumitomo	x
Michel Allard – Cogeco	
Mike Darling – Shaw	
Mike Emmendorfer – Arris	

Nicola Varanese – Qualcomm	
Ony Anglade – Cox	
Patrick Stupar – Qualcomm	
Peter Wolff – Titan Photonics	
Raanan Ivry – Wide Pass	
Ramdane Krikeb – Videotron	
Ron Wolfe – Aurora	
Saif Rahman – Comcast	x
Sanjay Kasturia – Qualcomm	
Satish Mudugere – Intel	
Steve Shellhammer – Qualcomm	x
Thushara Hewavithana – Intel	
Tim Brophy – Cisco	x
Tom Staniec – Cohere	x
Tom Williams –Cablelabs	
Venkat Arunarthi – Cortina	
Victor Hou – Broadcom	
Volker Lisse - CEL	x
Yitshak Ohana - Broadcom	

## Agenda

- Attendance
- Review IEEE Patent Policy
- Modulation Profile Definition

## Patents Policy

- Everyone familiar with the policy; no response to call for patents

## EPoC Modulation Profile Definition

Slide 17

- Does this apply to a FEC codeword? Yes
- What is the scope of the QAM modulation order: not yet decided
- What happens when one subcarrier has very poor performance, but the others are high. Could we get a lot of bit errors on that subcarrier
  - The implementation should account for how much variation there may be among subcarriers
  - May lose some bits in some subcarriers, the interleaver and FEC will help to fix these
  - If you have a really bad subcarrier, they could be excluded/nulled
    - Isn't there a distinction btwn subcarriers that are shut off because they cannot be used and those that just have poor performance, but are still used?
      - If so, how do we describe?
      - Testing has shown that averaging out subcarriers leads to a lot of errors, and the correction is lost when noise comes in.

- Unless you can correct for all bit errors, you don't want the average to be up to the maximum
- Do all codewords have the same size?
  - Assumption is that there are codewords of different sizes available.
  - This hasn't yet been decided
  - Can we use different codeword sizes in a single transmission?
    - Codeword size is determined by QAM modulation order (bit loading) and FEC rate

#### Slide 18

- Marker defines the modulation profile for the following subcarriers
  - This approach seems very complicated to implement
- There is another proposal for an attenuated modulation order; scales differently
  - Simplifies this – don't have to store as many numbers
- Don't see constant QAM modulation across a wide channel working well.
- FEC code rates should be based on the burst size

Code rate and size should be independent of QAM modulation order

- This is the Bit-Loaded modulation profile

Burst markers indicate both MP and the end of the burst. The burst markers bound the burst and convey the modulation order. Determine the FEC

Any time that you have to break up codewords, we introduce a lot of inefficiency

- Transitioning between different code rates at times that are not bounded by the transmission marker

How much overhead will be needed to communicate the bit loading? What is acceptable?

- Question is when is it sent and how often.
- Would need a marker for each profile; probably don't want to define more than 10.
- The description of the table would be sent over the PLC; the number of entries in the table could end up being the issue.
  - Were we discussing 3-5 profiles?
  - Would have to define all of the subcarrier MP details
  - The number of bits to describe the table can be made manageable

Number of profiles

- 3: Bad, middle, best?
- 4: bad, lower middle, upper middle, best?

Started drafting straw poll

CNU supported MPs in DS:

1. Multicast – pretty good
2. Best – best possible
3. PLC-quality channel: used in catastrophic event?

Joe to add the motion to slide 12

Straw poll 2

- Defines the number of active profiles; this is a subset of all profiles that a CLT would have to support at a given time. The CLT will be required to support a larger number of profiles, but only a smaller number at any given time.

Results of the straw polls are captured in the meeting slides.

Plan for next meeting is to continue to work on the definition of the Modulation Profile types and how they are applied.