

Unconfirmed Minutes - Multiple MCS IEEE 802.3bn EPoC Ad Hoc - 042513

Attendance

Attendee	Present
Alan Brown – Aurora	
Andre Lessard – CommScope	
Andrea Garavaglia – Qualcomm	
Avi Kliger – Broadcom	
Bill Keasler – Ikanos	
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	
Dylan Ko – Qualcomm	
Ed Boyd – Broadcom	
Ed Mallette – Brighthouse	
Eugene Dai – Cox	
George Hart – Rogers	x
Guansheng Lu – Huawei	
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	x
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	
Tom Williams –Cablelabs	
Venkat Arunarthi – Cortina	
Victor Hou – Broadcom	
Volker Lisse - CEL	
Yitshak Ohana - Broadcom	

Agenda

- Attendance
- Review IEEE Patent Policy
- EPoC Modulation Profile – Agree on current definition

Patents Policy

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

EPoC Modulation Profile – Steve Shellhammer/Andrea Garavaglia

Steve presented these slides for Andrea (forwarded to the reflector at the beginning of the meeting)

A profile means same modulation order and FEC rate for all sub-carriers?

- This still needs to be decided, but this is the proposal.
- If a profile is a specific MCS, then there is a common modulation and coding rate across all subcarriers.
- For a resource block, the QAM order and coding rate (MCS) are the same.
 - Does this mean that a given profile has same modulation order for all subcarriers? Yes. F
 - In the DS, the group of subcarriers is the entire channel
 - Single codeword for the entire block and the MCS is determined by the average of all subcarriers.
 - In the US, it's shared. Within a resource block, MCS is the same. Each resource block could have a different MCS.
- In an MCS, there are two variables: modulation order and coding scheme.
- Can we set a maximum number of MCS per channel? – TBD
- For the time that you are in a given profile, the modulation order and coding rate stay the same

- Each block has a marker which conveys this. Every frame has a marker.

Bitloading is another option, but this would add to scheduler complexity

US Burst mode

- Averaging not as effective, given the number of subcarriers used in a burst
- FEC code words have to be short
 - Data is small and from different sources
- Burst marker at the beginning conveys burst length and Mod Profile (MCS)
 - May have an end marker to mark end of transmission - TBD

Do MSOs assume that channel impairments across the spectrum will be the same across all users?

- Option B on slide 7 provides a little more flexibility
- Since Service Groups are small, transmitting at LCD may not leave that much on the table.
 - Right now, we say that the DS has one profile

System can be configured to only use the modulation profiles that are necessary; don't need to have all profiles active for all service groups.

While a cable plant does only change slowly, it is not static. We would expect that the characteristics of a profile can be changed.

- Does the system have to be brought down to change, or can it be a hitless move?
- Need to not lose packets when modulation profile is changed?

Can the MCS be changed dynamically symbol by symbol?

- For example, if we probe the system and we see changes to the plant, could we change the MP to adapt to the plant conditions? Can this be done with markers?
 - Certainly is a use case that could be supported if MPs can be changed that easily.

Decisions that need to be made

What is in a DS Burst Modulation Profile?

What is in an US Burst Modulation Profile?

Per channel?

How many can there be and what are they? (Each needs a marker)

How do you switch MP? Is there a large set that are supported or a smaller set that allows for quicker changes between MPs?

Marker definition: this will help us understand how many we can have.

What is the limitation of the MAC as far as changing MP?

Time scales:

- Allow to change over a longer period of time for channel aging
- Shorter time scale that allow more dynamic changes
- How do we bound these and determine the complexity of each?

If the number of MP is not too large, then the timing problem is solved. However, if it grows and you can only use a subset, if you want to “swap out” profiles into that useable subset, then we have to deal with the ability of the system to make these changes.

- Is likely different in the US and the DS