Evaluation Criteria and Requirements Ad Hoc – Minutes October 18, 2012

Provided IEEE-SA Patent Policy.
- https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf

Everyone on the call is familiar with the IEEE patent policy.

Questions on MSO Requirements
Steve Shellhammer (Qualcomm)

Prior to the call Jim Farmer provided some answers to the questions in the presentation. We reviewed the version of the presentation with Jim's answers

George Hart asked whether the standard needs to specify the EPoC frequency band, and could that be a product issue and not a standard issue.

Leo raised concern about interoperability if we do not specify the frequency bands and the center frequencies.

Steve agreed that we need specify frequency band, equipment can support wider frequencies but needs to support what the standard specifies.

Marek agreed that the standard specifies the minimum and the product can do more.

George pointed out that the IEEE is steering clear of product specifications. Could the product send messages about its capabilities? It would require a minimum channel bandwidth. We will need to support different spectrum in different regions around the world. We would start with very little spectrum and more in the future.

Marek said that he is referring to product implementation. Typically, 802.3 does not address detailed product specifications.

Steve pointed that capabilities exchange would happen at Link Initialization and that can be discussed at the Link Ad Hoc.

Ed Boyd agreed.

George said that there is usable passband up to 1200 MHz. He would prefer that as the upper band edge.

Leo said that 5 MHz there is a large group delay due to the lower corner surge protection. And there is a filter, and at that frequency the channel is noisy. The 5-15 (of 5-20) MHz is of marginal quality. An OFDM system in that band would be penalized. In DOCSIS they start at around 15 MHz. We may debate where the low end is. We may want to start at 10 or 15 MHz on the low end.

Nicola said that he has seen in past contributions, there were contributions where the upstream uses the high band. Do we consider that high band? Some of this will be rediscussed once we have a channel model. I am not sure if we can eliminate some frequency bands until we have the channel model.

Leo says we have a lot of knowledge about the return path. In the TDD case it would be Node+0. The return above 1 GHz, will be Node+0 like the TDD. No equipment exists today and it is difficult to get a channel model when we do not have real equipment.

Nicola pointed out that the MSO may be considering improving the plant.

Leo said the traditional improvement is to move the Node and improve the bandwidth and SNR. Moving above 1GHz is not a traditional improvement.

Nicola said maybe we should call it a modification instead an improvement.

Leo pointed out that the 108 MHz is in equipment today and hence it is not something new.

Leo said that Jim is correct about the 42 MHz and the 40-42 MHz group delay. As we go to a shorter cascade of amplifiers the group delay gets better. Europe is up to 65 MHz. There is some equipment that goes to 85 MHz. As you go to higher frequency the group delay gets less. The improvement gets better approximately by the square of the diplexer frequency.

Bill said that DOCSIS channels are much wider than our subcarrier spacing so OFDM may operate okay in this frequency band.

Leo pointed out we need to have a cyclic prefix that addresses the poor group delay in the 5-15 MHz. And in the upper frequencies there is more group delay, but there is more attenuation. At the lower frequencies there is large group delay and low attenuation. Unless we divide into smaller bands, then the cyclic prefix needs to address the worst case of the 5-10 MHz. In the lower bands DOCSIS uses SCDMA due to these issues.

Steve we may need to have a longer cyclic prefix if we choose to utilize the 5-15 MHz frequencies and that the cyclic prefix may be larger than in the downstream. Leo agreed.

Duane pointed out we have the 1 Gb/s objective and the objective for symmetric and asymmetric data rates, so we need to make sure we address those objectives.

Bill asked if the MSOs are likely to operate a high-band upstream above the downstream, in a Node+0 cable plant. Nicola agreed that we should be asking questions to the MSOs and understand what they need.

Leo pointed out that synergy with DOCSIS 3.1 and that DOCSIS is not doing TDD.

Bill said that TDD could be done in EPoC even though DOCSIS is not doing it.

George pointed out that TDD is an EPoC consideration. Anything that happens in DOCSIS should not limit us in EPoC. At Rogers we have a lot of Node+0 cable plant and we will have more of it going forward.

Steve said that a one of the distinguishing features of EPoC versus DOCSIS is support for TDD.

George said if we have 1200 MHz cable plant would operate around 700-1200. In the future it would evolve down to lower frequency, ultimately going down to 5 MHz. Bill pointed out we need the low bands for China.

Leo said there is a Tap Manufacturer that is did make 1.7 MHz, but the taps that were measured did not go to 1.7 MHz, they went up to around 1.4 MHz. The actual performance did not meet the advertised specification.

Steve said that Jorge has said in the past that if MSOs were buying these Taps then the manufacturers would produce them.

Leo pointed out that he was involved with Alberto at CableLabs in evaluating these Taps.

George that this looks like a product question. We will be requiring the ability to bond 192 MHz and that would need to be standardized.

Duane suggested enough to have enough to fill the entire band. George agreed with that.

George agreed that we would some day need to support 5-1200 MHz.

Duane said that means that the standard would need to support bonding of up to six 192-MHz OFDM channels in the downstream.

Bill asked Steve to update the slides capturing what we discussed on the call and Jim's comments.

There will not be a meeting next Thursday since Steve will be flying to China at that time.

Attendance

Person	Affiliation
Alan Brown	Aurora
Dave Barr	Entropic
Ed Boyd	Broadcom
Marek Hajduczenia	ZTE
Charaf Hannan	ST Micro
George Hart	Rogers Communications
Brian Kinnard	CommScope
Mark Laubach	Broadcom
Leo Montreuil	Broadcom
Paul Nikolich	YAS Broadband Ventures
Bill Powell	Alcatel Lucent
Duane Remein	Huawei
Steve Shellhammer	Qualcomm
Joe Solomon	Comcast
Nicola Varanese	Qualcomm