

P2MP Optics Alignment

ITU-T Q2/15 == IEEE 802.3ah

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 - Optical Solutions
 - Flexlight
 - Alcatel
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Outline

- Power Level Alignment
 - OLT Transmitter Control Accuracy
 - 20 km Upstream Link Feasibility
- Timing Value Alignment
 - ONT transmitter On/Off time
 - OLT receiver recovery times

Power Level Alignment

	ITU-T		IEEE	
	A	B	10	20
Downstream	A	B	10	20
OLTmin (dBm)	-4	+1	-4	+1
OLTmax (dBm)	+2	+7	0	+5
ONTmin (dBm)	-25	-25	-25	-25
ONTmax (dBm)	-3	-3	-5	-5
Upstream	A	B	A	B
ONTmin (dBm)	-3	-2	-3	-3
ONTmax (dBm)	+2	+3	+2	+2
OLTmin (dBm)	-24	-28	-26 (-24)	-29
OLTmax (dBm)	-3	-7	-3	-8

Issue 1: OLT Tx Power range

- Current OLT Tx IEEE range is 4 dB
 - A little tight for mass produce-ability
- ONT Tx power range is 5 dB
 - Taken to be mass produce-able
- OLT Tx power range should follow ONT
 - This will improve OLT Tx yield
- Recommend that both 10 and 20 km
 - OLT Tx max power be increased by 1 dB.
 - ONT Rx min overload be increased by 1 dB.

Issue 2: 20 km Upstream Link

- Current IEEE 20km OLT Rx sensitivity is -29 dBm
 - This is very difficult to achieve in practice
 - APD receivers (certainly required) are degraded in burst mode operation
- Recommend that the 20km values be changed
 - OLT Rx sensitivity and overload increase 1dB
 - ONT Tx min and max power increase 1 dB

Issue 2: ONT types

- Note: The suggested change will give the two ONT types different transmitter powers
- This doesn't change the current number of PMDs, since the two ONT types have different laser technologies (FP versus DFB)
- When FEC is worked out, we can see if a single laser technology is feasible
- At that point, the power budget may be modified to take FEC into account

Timing Value Alignment

- There are two completely separate issues in the area of timing
 - ONT Transmitter ON/OFF performance
 - OLT Receiver recovery performance
- Separate because
 - Different components
 - Different technology
 - Different vendors
 - Different interaction with protocol layers

ONT Transmitter ON/OFF time

- Current target is 16 bits for ON and OFF
 - These targets align with ITU-T
 - These targets supported by all Q.2/15 participants and others as well
- To date, nobody has presented any data that these values are difficult to implement
- Furthermore, there is no protocol dependence for the Tx ON and OFF times
- Recommend that the Tx ON/OFF times be set to 16 ns each.

OLT Receiver Recovery times

- Current target is 50 ns for $T_{dsr} + T_{lr}$
 - This target aligns with ITU-T
 - This target supported by all Q.2/15 participants and others as well
- There is only a small protocol dependent effect with these values
 - As long as preamble is balanced, level recovery will work as always
- Remember: Clock recovery and frame delineation are NOT included in the 50 ns
- Recommend that $T_{dsr} + T_{lr}$ be set to 50 ns

OLT Receiver (continued)

- If there is a place for a 'non spec', the OLT receiver is it
- If consensus can't be reached on the OLT timing, then leave it blank
 - MPCP logic can compensate
 - Single downstream broadcast message configures the PON
- In contrast, doing the same for the ONT is a poor idea
 - OLT must learn and keep track of all the ONTs?
 - Protocol implications (messages, etc.)
 - Complexity, brand identity issues