

Video signal impact in 10G EPON

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Power penalties in 10G EPON system [1]

No.	Item	Influence from video overlay	Comments
1	Linear crosstalk	Excluded from the standard (?)	Providing that the S/X is large enough, the impact of the video overlay channel is negligible
2	SPM	No	
3	XPM	Negligible impact though more detailed study is necessary	Becomes negligible for downstream video and 10G downstream digital channel spaced by more than 5 nm (JLT, vol.17 No.10 Oct 1999 pp. 1782-1792.)
4	SRS	Need to study (and include in the standard ?)	Impacts the downstream digital transmission channel if in the proximity of the downstream analog video channel @ 1550 nm
5	RIN	Excluded from the standard (?)	Since RIN of a transmitter of video signal is generally $\leq -140\text{dB/Hz}$, with sufficiently large S/X value, RIN can be neglected.

Power penalties in 10G EPON system [2]

No.	Item	Influence from video overlay	Comments
6	SBS	Need to study (and include in the standard ?)	Limits the maximum launched power in the digital downstream channel. Can be mitigated to some extent using dithering.
7	Shot noise	Excluded from the standard (?)	<p>If S/X is small enough, shot noise can be neglected:</p> $2e \times R \times (P_{10Grev} + \frac{X}{S} P_{vr}) \approx 2e \times R \times P_{10Grev}$ <ul style="list-style-type: none"> - R is O/E conversion efficiency. - P10Grev is a receive power of 10G-EPON signal at the ONU RX level - Pvr is a receive power of the video signal at the ONU RX level.

S/X: isolation between the digital and video signals received at the ONU level.