LIST OF ABBREVIATIONS

2R----------Re-amplification and Re-shaping
ACF ----------Autocorrelation Function
BER ----------Bit Error Rate
ccg ----------Complex Circular Gaussian
CIB ----------Consecutive Identical Bits
CLS----------Centralized Light Source
CO ----------Central Office
CS----------Current Source
DB ----------Duobinary
DCA----------Digital Communication Analyzer
Demux ----------Demultiplexer
DFB ----------Distributed Feedback Laser
DRB ----------Double Rayleigh Backscattering
DSP----------Digital Signal Processing
EDFA ----------Erbium Doped Fiber Amplifier
ER ----------Extinction Ratio
FEC ----------Forward Error Correction
FPLA----------Fabry-Perot Laser Amplifier
FTTP----------Fiber to the Premises
FWHM ----------Full Width at Half Maximum
FWM----------Four Wave Mixing
GA----------Gaussian Approximation
HDTV----------High Definition Television
HFC ----------High Frequency Cutoff
IB ----------Interleaved Bidirectional
IC ----------Interferometric Crosstalk
IM-DD ----------Intensity Modulated Direction Detection
I/O ----------Input-Output
ISI ----------Inter-symbol Interference
LFC ----------Low Frequency Cutoff
LP----------Lasing Polarization
LPF----------Lowpass Filter
MPI----------Multipath Interference
MZM----------Mach-Zehnder Modulator
NEB ----------Noise Equivalent Bandwidth
NEP ----------Noise Equivalent Power
NF ----------Noise Figure
NRZ ----------Non-return to Zero
OADM----------Optical Add-Drop Multiplexer
OBPF ----------Optical Bandpass Filter
OEO----------Optical-Electrical-Optical

OFC ----------Optical Fiber Communications Conference
OIP ----------Optical Information Processing
ONU----------Optical Network Unit
OP ----------Orthogonal Polarization
OSA ----------Optical Spectrum Analyzer
OSNR ----------Optical Signal to Noise Ratio
$OSNR_{ASE}$ ----------Optical Signal to Noise Ratio due to ASE
$OSNR_{RB}$ ----------Optical Signal to Noise Ratio due to RB
$OSNR_{XT}$ ----------Optical Signal to Noise Ratio due to Crosstalk
OSP----------Optical Signal Processing
PBS----------Polarization Beam Splitter
PDF----------Probability Density Function
PM----------Phase Modulator
POLC ----------Polarization Controller
PON ----------Passive Optical Network
PRBS----------Pseudo-random Bit Sequence
PSD----------Power Spectral Density
QL_{ASE} ----------ASE-limited Quantum Limit
RA ----------Raman Amplifier
RB ----------Rayleigh Backscattering
RB_1 ----------Type 1 Rayleigh Backscattering
RB_2 ----------Type 2 Rayleigh Backscattering
RZ ----------Return to Zero
SBS ----------Stimulated Brillouin Scattering
SRS----------Stimulated Raman Scattering
SE----------Spectral Efficiency
S/N, SNR ----------Signal to Noise Ratio
SOA ----------Semiconductor Optical Amplifier
TC ----------Transfer characteristic, Temperature controller
VCSEL ----------Vertical Cavity Surface Emitting Laser
VCSOA----------Vertical Cavity Semiconductor Optical Amplifier
VOA----------Variable Optical Attenuator
VOD----------Video on Demand
WSS ----------Wide Sense Stationary
XGM ----------Cross Gain Modulation
XPM----------Cross Phase Modulation

LIST OF SYMBOLS

α_{PB} ..... Ratio of noise rejection to total available noise
α_{mod} ..... Average power to peak power scaling ratio
β ..... Ratio of peak power to average power
B_e ..... Electrical Filter Bandwidth (Hz)
B_o ..... Optical Filter Bandwidth (Hz)
B_{RBW} ..... Resolution Bandwidth Filter (Hz)
B_s ..... Gaussian Approximated Signal Bandwidth (Hz)
b(t) ..... Optical filter impulse response
C ..... Capacity (bits/s) or Capacitance (F)
d ..... Duty Cycle of the pulse
Δf ..... Frequency Offset (Hz)
$\Delta\nu$ ..... Laser Linewidth (Hz)
$e_{sig}(t)$ ..... Optical Signal Field Amplitude into Preamplifier
e_x, ER ..... Extinction ratio (linear units)
F ..... Noise Figure (dB)
F_{ISI} ..... Q-factor scaling factor from filter induced ISI
G ..... Amplifier Gain
G_{opt} ..... Optimal gain at ONU
γ ..... Inverse ER
γ_{mod} ..... $OSNR_{ASE}$ measurement scaling factor
gL ..... Single pass gain
η_{pol}, η_{RB} ..... RB Polarization Coefficient
h(t) ..... Electrical filter impulse response
H(f) ..... Receiver Filter Frequency Response
I_{av} ..... Average Intensity Inside VCSOA
I_{bias} ..... Bias Current
I_{in} ..... Input Intensity
I_{ref} ..... Reflected Intensity
I_{th} ..... Threshold Current
I_{trans} ..... Transmitted Intensity
L ..... Span Loss (1/km)
μ_1 ..... Mean Mark Photocurrent (A or V)
μ_0 ..... Mean Space Photocurrent (A or V)
N_{ASE} ..... ASE Spectral Density (W/Hz)
n_{ph} ..... Number of Photons
n_{QL} ..... ASE-limited Quantum Limit (photons/bit)
P_1 ..... Peak Pulse Power (W)
P_{ave}, $<P_s>$ ..... Average Signal Power (W)
P_L ..... Launched Power (W)
p_m ..... Average Mark Probability

P_{RB} ..... Total RB Power (W)
Q ..... Q-factor
R ..... Data Rate (bits/s), or resistance (Ω)
R_D ..... Detector Responsivity (A/W or V/W)
σ_1 ..... Mark Standard Deviation (A or V)
σ_0 ..... Space Standard Deviation (A or V)
s(t)..... Photocurrent at decision circuit
s_{th} ..... Decision Circuit Sampling Threshold (A or V)
$S_{actual}(f)$ ..... Actual RB PSD (W/Hz)
$S_{\Delta\nu}(f)$ ..... Laser PSD (W/Hz)
$S_{NRZ/RZ}(f)$ ..... PSD of NRZ or RZ Modulation (W/Hz)
S_{RB} ..... Rayleigh scattering coefficient
$S_{RB}(f)$ ..... RB PSD (W/Hz)
$S_{sig}(f)$ ..... Signal PSD (W/Hz)
T_B ..... Bit Period Duration (s)
t_s ..... Sampling Instant Relative Phase (s)