

Free-Space Optical Link Channel Measurements from FOCAL Test Range, McMaster University

These channel measurements are performed on our experimental setup established in late 2010. We have an ongoing campaign of measurement and will be posting new data continuously.

Noise:

The noise is well modelled as AWGN with $\mu = 0.6214 \text{ mV}$, $\sigma = 0.7931 \text{ mV}$.

Channel Measurements:

Three folders exist:

1_Clear_Weather_Low_Scintillation: channel measurements in clear weather with low scintillation index

2_Clear_Weather_High_Scintillation: channel measurements in clear weather with high scintillation index

3_Rain: channel measurements during rain

Each folder contains:

Channel_Measurements_csv.zip: a compressed folder that contains 1342177280 channel samples at the rate 101.791 kSa/s for a continuous duration of 3 hrs : 39 min : 45.55 sec. Measurements are divided into 80 files in the .csv format, each file has 16777216 samples. Each sample of the channel gain is represented in a byte (8 bits). To convert the samples to units of volts, a 0.1242 mV/Sa scaling factor is required.

Measurement_Conditions.pdf: states the date and time, transmitter and receiver parameters, weather parameters, and resulting average channel gain and scintillation index.

Markov_Model_for_samples_xx.zip: a compressed folder that contains a 64-state Markov model derived from samples in file no. xx:

T_matrix.csv: 64X64 state-transitions probability matrix

p_vector.csv: 1X64 steady state probability vector

average_channel_gain.csv: 1X64 vector of channel gain vector corresponding to each state

samples_Markov_64.csv: 16777216 samples generated using the derived Markov model