

Backing up FSO 850 nm System by Radio 58 GHz System – Technological Diversity Characteristics

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Attenuation due to hydrometeors (rain, snow, fog) at 57 650 MHz on V polarisation has been measured on a 850 m long experimental path. An experimental free space optical (FSO) link on 850 nm operates exactly on the same path as the radio link.

The meteorological conditions were identified by means of both video bw camera images of the space between the transmitter site and the receiver site and data obtained from an automatic meteorological station located near the receiver site. Two tipping-bucket raingauges with different collecting areas are used for measurement of rain intensities. The VAISALA PWD 11 equipment is used for the visibility measurement.

Calibrated received signals of both radio and FSO links have been gathered continuously on PC hard disc, and data over the period from August 2004 to July 2005 were processed statistically. Individual attenuation events were compared with the concurrent meteorological situations and were classified according to the types of individual hydrometeors occurred.

For both radio and FSO paths, the cumulative distributions (CDs) of attenuation due to individual hydrometeors for both single months and the whole year period will be given. The obtained CD of rain attenuation for the whole year will be compared with the calculated one according to the corresponding ITU-R recommendation. Technological diversity characteristics, i. e. the diversity gain and the diversity improvement obtained by this special type of diversity used will be presented. The results obtained will be broadly discussed.

The results obtained in the frame of our long-term experimental research are new, up to date and applicable for radio systems as well as FSO systems which for backing up use radio systems.

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