Title: Spatial optical transceiver system–based key solution for high data rates in measured index multimode optical fibers for indoor applications.

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Abstract: This study has simulated the spatial optical transceiver system based on measured index multimode optical plastic fibers channel with 1 Tb/s in 1.5 km distance. These plastic optical fibers are simply step index polycarbonate, step index polystyrene, step index polymethylmethacrylate, graded index polymethylmethacrylate and graded index cyclic transparent optical fiber (GI-CYTOP). Maximum Q-factor, optical signal power at optical fiber channel, receiver sensitivity, and coupling coefficient for sample of modes are measured based on GI-CYTOP fiber for the comparison between the previous model and the proposed model. This study clarified the enhancement of both maximum Q-factor and receiver sensitivity even though at high signal losses. The optimized Q-factor and receiver sensitivity are obtained for various plastic optical fiber channels. Power intensity level of dominant mode–based GI-CYTOP fiber channel is measured. The proposed model has presented better performance based on GI-CYTOP fiber channel in maximum Q-factor, which is within the percentage ratio ranging from 45.65 to 53.26%, optical signal power is within the percentage ratio ranging from 32.87 to 44.77%, and receiver sensitivity is within the percentage ratio ranging from 6.3 to 12.26% than the previous model at transmission distance ranges from 500 to 1500 m and bit rate of 2.5 Gb/s. GI-CYTOP fiber clarified better performance in maximum Q-factor and receiver sensitivity response better than other plastic optical fibers channels.

Keyword: High Data Rate, Measured Index Multimode Fiber, Plastic Fibers, Spatial Optical Receiver, Spatial Optical Transmitter.

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