

In terms of achievable real capacity, the data rate increases significantly from 600 Mbit/s using 16 subcarriers up to 1.6 Gbit/s with 2048 subcarriers, while maintaining a constant bit-error-ratio of $1.5 \cdot 10^{-3}$, below the FEC limit. For $N > 2048$ the performance saturated and data rate did not increase significantly. On the other hand, increasing the number of subcarrier, the digital signal processing complexity increases. Therefore 512 subcarriers is very good compromise between the data rate and complexity, losing only 4% of capacity achievable in case of 2048 carriers.

4. Conclusions

A gigabit-class visible OW transmission has been reported based on a commercial RGB LED. We demonstrated 1.5 Gbit/s transmission capacity in the single channel operation and 3.4 Gbit/s transmission capacity in WDM operation. To achieve these results we adopted a DMT modulation based on an optimum bit-power loading allocation. The measured BER values were always below $2 \cdot 10^{-3}$, i.e. within the FEC limit, for both systems. These results were achieved at brightness level of 410 lx. Further improvements may be expected by a suitable choice of the amplifier bandwidth (280 MHz instead of 130 MHz) and overcoming the focusing problem increasing the distance between transmitter and receiver using several LEDs.