Phase Noise Compensation for Nonlinearity-Tolerant Digital Subcarrier Systems With High-Order QAM

The fundamental penalty of sub-carrier modulation (SCM) with independent sub-carrier phase noise processing is estimated. It is shown that the fundamental signal-to-noise ratio (SNR) penalty related to poorer phase noise tolerance of decreased baudrate subcarriers increases significantly with modulation format size and can potentially exceed the gains of the nonlinear tolerance of SCM. A low complexity algorithm is proposed for joint sub-carrier phase noise processing, which is scalable in the number of sub-carriers and recovers almost entirely the fundamental SNR penalty with respect to single carrier systems operating at the same net data-rate. The proposed algorithm enables high-order modulation formats with high count of sub-carriers to be safely employed for nonlinearity mitigation in optical communication systems.

General information
State: Published
Organisations: Department of Photonics Engineering, Coding and Visual Communication, High-Speed Optical Communication, Centre of Excellence for Silicon Photonics for Optical Communications, Polytechnic University of Milan
Contributors: Yankov, M. P., Barletta, L., Zibar, D.
Number of pages: 12
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: IEEE Photonics Journal
Volume: 9
Issue number: 5
ISSN (Print): 1943-0655
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.82 SJR 0.893 SNIP 1.128
Web of Science (2017): Impact factor 2.627
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.27 SJR 0.858 SNIP 1.115
Web of Science (2016): Impact factor 2.291
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.41 SJR 1.137 SNIP 1.169
Web of Science (2015): Impact factor 2.177
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.47 SJR 1.446 SNIP 1.332
Web of Science (2014): Impact factor 2.209
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.83 SJR 1.544 SNIP 1.426
Web of Science (2013): Impact factor 2.33
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Scopus rating (2012): CiteScore 2.69 SJR 1.806 SNIP 1.556
Web of Science (2012): Impact factor 2.356
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
Scopus rating (2011): CiteScore 2.93 SJR 1.544 SNIP 2.478
Web of Science (2011): Impact factor 2.32
ISI indexed (2011): ISI indexed no