NEC demonstrates first terabit/s superchannel transmission over 10,000km

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NEC Corporation has announced the successful experimental demonstration of 1.15-Tb/s ultra-long haul optical transmission over 10,000 kilometers using optical superchannel technology.

This is the first instance that a terabit/s channel generated from a single laser source has been transmitted over such a distance. Four superchannels were transmitted together by wavelength division multiplexing (WDM) to achieve a total capacity of 4 Tb/s and a spectral efficiency of 3.6 b/s/Hz. The results clearly demonstrate that practical high-capacity transmission for transoceanic communication can be achieved using cost-effective superchannel technology.

Optical superchannels allow phase-locked carriers with independent modulation to overlap in frequency following the principles of orthogonal frequency division multiplexing (OFDM). This enables efficient bandwidth utilization, allowing higher spectral efficiency and higher data rate per laser through parallelization. NEC's system uses state-of-the-art hardware and advanced techniques, including optical multi-tone generation, large-core/ultra low-loss fiber, intradyne digital coherent detection, and digital equalization at higher oversampling, along with well-established technologies such as EDFAs and DP-QPSK modulation. The experiment yielded a 2-dB system margin above the hard decision FEC threshold without using processing-intensive MAP or MLSE algorithms.

This work was conducted by NEC Laboratories America, NEC's

research group in Princeton, New Jersey, USA and the result was published as a post-deadline paper in the recent Asia Communications and Photonics Conference (ACP 2011) in Shanghai, China, after rigorous scrutiny by the ACP program committee.

"This success is an example of NEC's leadership in high capacity, long distance optical communication technologies, following its record achievements of 101.7 Tb/s per fiber for single core fiber transmission, the first terabit field trial with coexisting 100G, 450G and 1T signals on the same fiber, and the highest order QAM optical transmission of 1024QAM" said Dr. Yasuhiro Aoki, General Manager for NEC's Submarine Network business.

Source: NEC