

APPLICATION OF MULTI-FREQUENCY UNDERWATER COMMUNICATION SYSTEMS BASED ON MAGNETIC INDUCTION

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The article provides a review of research into technical systems using magnetic-inductive coupling for practical use in freshwater and marine areas. The features of the propagation of a magnetic field in aquatic environments and the possibility of using the phenomenon of magnetic induction as one of the methods of information transmission are reflected. The issue of ensuring data transmission with an assessment of the quality indicators of the communication channel in systems that support the multi-frequency method of orthogonal frequency division of signals with multiplexing (OFDM) is analyzed. An experiment was carried out to obtain values for the range and throughput of magnetic-inductive communication systems with a selected type of small-sized antennas on ferromagnetic cores. There are possibilities for transmitting information at distances of up to 5 meters at speeds of up to several tens of kbit/s using transmitters with a power of up to several tens of W, using multi-frequency OFDM systems with high spectral efficiency, as well as telemetry data at distances of up to 10 m at speeds of up to 1 kbit/s. If it is difficult to use radio or hydroacoustic communication systems on underwater complexes, magnetic-inductive systems can be used for communications in heterogeneous environments, such as water-air and other conditions.

Keywords: magnetic induction, underwater communication, ferrite antennas, near-field magnetic communication, permeability, underwater communication channels, OFDM

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