

ABSTRACT

METHOD OF MULTIPLE ACCES COMMUNICATION IN A CENTRALIZED NETWORK BASED ON AN ULTRA WIDEBAND IMPULSE PHYSICAL LAYER

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Method of multiple access communication in a centralized network based on an ultra wideband impulse physical layer allowing code-based multiple access, each user being associated with a code, the transmission being performed in an asynchronous manner in a propagation medium with multiple
10 paths. It is characterized in that a criterion is established so as to find the codes of the N_u various users making it possible to minimize the variance of the multi-user interference J_n at the output of a linear receiver, the signal received $r(t)$ originating from a user being expressed in the form of a sum of the signal of interest $r_n(t)$ originating from user n and of a term corresponding
15 to the multi-user interference, J_n where

$$r(t) = r_n(t) + J_n + n(t)$$

with $r_n(t) = \sum_{k=1}^{N_p} A_n^k s_n(t - \tau_n^k)$ where A_n^k and τ_n^k are respectively the amplitude

and the delay of the k th path of the transmission channel between user n and the receiver, and in that to determine the codes of the users use is made of
20 the partial cyclic inter-correlations of the codes which satisfy the following criteria:

$$\sum_{q=0}^{N_c N_f - 1} [C_{m,n}^{+2}(q) + C_{m,n}^{-2}(q)] = N_f^2,$$

$$\sum_{q=0}^{N_c N_f - 1} C_{m,n}^{+}(q) C_{m,n}^{-}(q) = 0,$$

for $m = 1, \dots, N_u$, $n = 1, \dots, N_u$ and $n \neq m$, where N_f is the number of frames, N_c
25 is the number of chips, and N_u is the number of users transmitting to the central point or the number of point to point links simultaneously transmitting in a point to point centralized network.

Figure 3 to be published