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(54) **RECEIVERS INCORPORATING NON-UNIFORM MULTIDIMENSIONAL CONSTELLATIONS AND CODE RATE PAIRS**

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CPC ***H04L 27/3405*** (2013.01); ***H03M 13/255*** (2013.01); ***H03M 13/6325*** (2013.01); ***H04B 17/336*** (2015.01); ***H04L 27/3809*** (2013.01)

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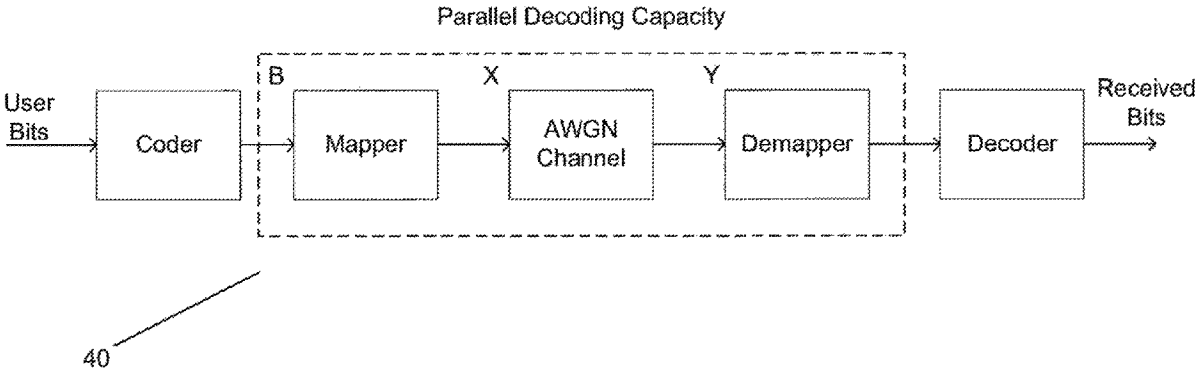
(57) **ABSTRACT**

Communication systems are described that use unequally spaced constellations that have increased capacity compared to conventional constellations operating within a similar SNR band. One embodiment is a digital communications system including a transmitter transmitting signals via a communication channel, the transmitter including a coder capable of receiving user bits and outputting encoded bits at a rate, a mapper capable of mapping encoded bits to symbols in a constellation, and a modulator capable of generating a modulated signal for transmission via the communication channel using symbols generated by the mapper, wherein the constellation is unequally spaced and characterizable by assignment of locations and labels of constellation points to maximize parallel decode capacity of the constellation at a given signal-to-noise ratio so that the constellation provides a given capacity at a reduced signal-to-noise ratio compared to a uniform constellation that maximizes the minimum distance between constellation points of the uniform constellation.

30 Claims, 43 Drawing Sheets



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See application file for complete search history.

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