

(54)	<b>AI-ASSISTED SELECTION OF DEMODULATION REFERENCE TYPE IN 5G AND 6G</b>	<b>Publication Classification</b>
(71)	Applicants: <b>David E. Newman</b> , Poway, CA (US); <b>R. Kemp Massengill</b> , Palos Verdes, CA (US)	(51) <b>Int. Cl.</b> <b>H04L 5/00</b> (2006.01) <b>H04L 27/38</b> (2006.01)
(72)	Inventors: <b>David E. Newman</b> , Poway, CA (US); <b>R. Kemp Massengill</b> , Palos Verdes, CA (US)	(52) <b>U.S. Cl.</b> CPC ..... <b>H04L 5/0051</b> (2013.01); <b>H04L 27/38</b> (2013.01)
(21)	Appl. No.: <b>18/121,779</b>	(57) <b>ABSTRACT</b>
(22)	Filed: <b>Mar. 15, 2023</b>	

**Related U.S. Application Data**

- (63) Continuation of application No. 17/976,950, filed on Oct. 31, 2022, now Pat. No. 11,626,955, which is a continuation of application No. 17/841,061, filed on Jun. 15, 2022, now Pat. No. 11,496,266, which is a continuation of application No. 17/585,985, filed on Jan. 27, 2022, now Pat. No. 11,387,961.
- (60) Provisional application No. 63/214,489, filed on Jun. 24, 2021, provisional application No. 63/220,669, filed on Jul. 12, 2021, provisional application No. 63/234,911, filed on Aug. 19, 2021, provisional application No. 63/272,352, filed on Oct. 27, 2021, provisional application No. 63/210,216, filed on Jun. 14, 2021.

Demodulation of 5G and 6G messages involves complex demodulation reference signals that occupy valuable resource grid area. Disclosed are numerous configurations of short-form demodulation reference types that provide sufficient modulation information to enable a receiver to determine all of the predetermined modulation levels of the modulation scheme, while consuming minimal resources. Selection of the appropriate modulation scheme and demodulation reference type generally depends on many competing factors. Therefore, an AI model may be required. The AI model may be trained on network data to recommend when a different modulation scheme would be beneficial, as the network default or to serve a particular user device. The AI model may be configured to select between the disclosed short-form demodulation references and prior-art demodulation reference signals, thereby optimizing the subsequent network performance as well as individual user satisfaction, while minimizing costs, bandwidth, power, and especially avoiding interference with neighboring cells.

