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Newman et al.(10) **Pub. No.: US 2023/0231645 A1**(43) **Pub. Date: Jul. 20, 2023**(54) **HOW TO MAXIMIZE PHASE-NOISE
MARGINS IN 5G AND 6G**(52) **U.S. CL.**
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(US)(57) **ABSTRACT**(72) Inventors: **David E. Newman**, Poway, CA (US);
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Enhanced phase-noise mitigation is possible at low-to-no cost. Communication at the high frequencies envisioned for late 5G and 6G will require much better phase-noise control than current frequency bands, because the tight margins will result in excessive phase faults and greatly reduced throughput. The disclosed examples show how to use two modulation schemes to provide the best phase margins at the final step. For example, the message can be initially modulated in classical amplitude-phase modulation as transmitted, but is received and processed using convenient QAM orthogonal components. Then the receiver can convert the results back to the amplitude-phase modulation scheme analytically, and can finally demodulate using calibrated amplitude and phase levels derived from a proximate demodulation reference. Since the amplitude-phase modulation scheme provides substantially larger phase margins than QAM with the same information content, substantially higher frequencies can be accessed while retaining high reliability.

