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**Karlquist**

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(54) **FREQUENCY TRANSLATING DEVICES AND FREQUENCY TRANSLATING MEASUREMENT SYSTEMS THAT UTILIZE LIGHT-ACTIVATED RESISTORS**

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(57) **ABSTRACT**

A frequency translating device (FTD) includes at least one light-activated resistor (LAR) connected to down-convert a radio frequency (RF) to an intermediate frequency (IF) and to up-convert an IF to an RF and a source of modulated light that is optically connected to the LAR. The source of modulated light is modulated in response to a local oscillator (LO) and the LAR is activated in response to the modulated light. Modulated light can be generated from a light source and an LO by, for example, directly modulating the light source, modulating a transmission switch that blocks the transmission of light to the LAR, or modulating a light path switch. The LAR-based FTD can be used as a reciprocal FTD to characterize another FTD in a three-pair measurement system. An FTD may include more than one LAR to form, for example, single-balanced and double-balanced LAR-based FTDs.

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(51) **Int. Cl.**<sup>7</sup> ..... **H04B 10/00**

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(58) **Field of Search** ..... 378/115, 163, 378/183, 185, 186, 197

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**26 Claims, 9 Drawing Sheets**

