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(72) Inventors; and

(75) Inventors/Applicants (for US only): **KAMGAING, Telesphor** [CM/US]; 2204 E Firestone Drive, Chandler, Arizona 85249 (US). **RAO, Valluri R.** [US/US]; 15115 El Quito Way, Saratoga, California 95070 (US). **PALASKAS, Yorgos** [GR/US]; 2335 NW Raleigh Street, Apt 317, Portland, Oregon 97210 (US).(74) Agents: **VINCENT, Lester J.** et al.; Blakely Sokoloff Taylor & Zafman LLP, 1279 Oakmead Parkway, Sunnyvale, California 94085 (US).

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(54) Title: CHIP PACKAGES INCLUDING THROUGH-SILICON VIA DICE WITH VERTICALLY INTEGRATED PHASED-ARRAY ANTENNAS AND LOW-FREQUENCY AND POWER DELIVERY SUBSTRATES

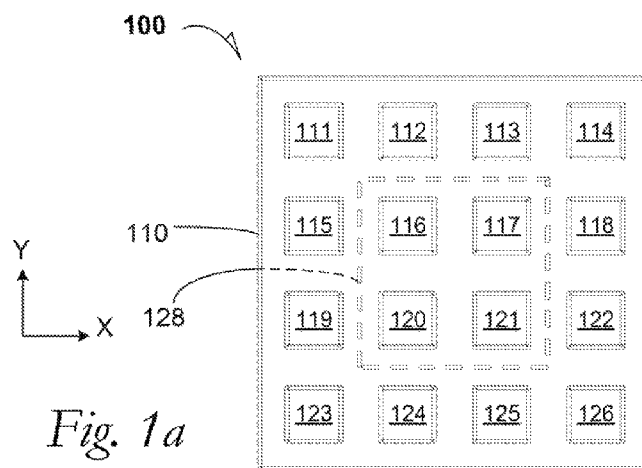


Fig. 1a

Fig. 1

(57) Abstract: An apparatus includes a die with through-silicon vias and radio frequency integrated circuit capabilities and it is vertically integrated with a phased-array antenna substrate. The through-silicon via and a radio frequency integrated circuit is coupled to a plurality of antenna elements disposed on the phased-array antenna substrate where each of the plurality of antenna elements is coupled to the through-silicon vias and radio frequency integrated circuit through a plurality of through-silicon vias. A process of assembling the through-silicon vias and radio frequency integrated circuit to the phased-array antenna substrate includes testing the apparatus.