Abstracts

Quasi-optical power amplifier using TEM waveguide concept

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A new E-plane quasi-optical waveguide power amplifier with an innovative low-loss integrated transition array of finline and microstrip is presented, which employs a concept of TEM mode waveguide. This TEM waveguide was proposed on a patterned surface or usually called uniplanar compact photonic bandgap (UC-PBG) structure. Our Ku-band back-to-back transition array demonstrates a return loss better than -17.5 dB and an insertion loss better than -0.65 dB. The TEM waveguide is found to have a 1 GHz bandwidth centered at 14.5 GHz. The use of such a frequency-selective surface has showed that one could implement more power cards inside this TEM waveguide. The space power combiner is used to combine the output powers of twelve 20 mW MMIC amplifier chips. The power module yields a 21.08 dBm output power including the loss of transition and a combining efficiency of 89% is observed in this work.

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