CLAIMS

1. A reactive beamformer, comprising:

a radiator disposed within a substrate and configured to radiate a received electromagnetic signal;

a plurality of receptors disposed within the substrate, each of the plurality of receptors configured to receive a portion of the radiated electromagnetic signal;

a plurality of signal lines, each signal line of the plurality of signal lines being coupled to a respective receptor of the plurality of receptors to convey the portion of the radiated electromagnetic signal from the respective receptor and to provide the portion of the radiated electromagnetic signal to an output; and

an electrically and physically contiguous conductive wall disposed in the substrate around a perimeter of the plurality of receptors and configured to contain the radiated electromagnetic signal to a region within the conductive wall, the radiator and the plurality of receptors being disposed within the region.

2. The reactive beamformer of claim 1, wherein each receptor of the plurality of receptors is formed of an electrically conducting wire deposited into a milled hole in the substrate.

3. The reactive beamformer of claim 2, wherein the radiator is formed of an electrically conducting wire deposited into a milled hole in the substrate.

4. The reactive beamformer of claim 2, wherein each signal line of the plurality of signal lines is coupled to one receptor of the plurality of receptors by a solder joint formed at least in part by a solder reflow process.

5. The reactive beamformer of claim 1, wherein the plurality of receptors is physically arranged circumferentially around the radiator, each receptor of the plurality of receptors being substantially equidistant from the radiator and substantially equally spaced from each other.

6. The reactive beamformer of claim 1, further comprising a plurality of electrically conductive isolation walls disposed within the substrate and configured to isolate each receptor of the plurality of receptors from adjacent receptors of the plurality of receptors.

7. The reactive beamformer of claim 6, wherein each of the plurality of electrically conductive isolation walls is formed of a conductive ink deposited into a trench in the substrate.

8. The reactive beamformer of claim 6, further comprising an electrically and physically contiguous conductive outer wall disposed around a perimeter of the plurality of receptors, the conductive outer wall being electrically coupled to each isolation wall of the plurality of electrically conductive isolation walls.

9. The reactive beamformer of claim 8, further comprising a ground plane adjacent at least one surface of the substrate, the conductive outer wall and the conductive isolation walls being in electrically conductive communication with the ground plane.

10. The reactive beamformer of claim 1, wherein the substrate is a first substrate and the plurality of signal linestraces is adjacent to a surface of a second substrate, the second substrate being bonded to the first substrate.

11. The reactive beamformer of claim 10, wherein the second substrate is indirectly bonded to the first substrate by one or more intermediate layers between the second substrate and the first substrate.

12. The reactive beamformer of claim 1, wherein the reactive beamformer is configured to operate in millimeter-wave frequencies. including 26.5 to 110 GHz.