reference in its entirety. This application is further related to co-pending U.S. Non-provisional Patent Application entitled “Excitation and Use of Guided Surface Waves,” which was filed on June 2, 2015 and assigned Application Number 14/728,507, and which is incorporated herein by reference in its entirety. This application is further related to co-pending U.S. Non-provisional Patent Application entitled “Excitation and Use of Guided Surface Waves,” which was filed on June 2, 2015 and assigned Application Number 14/728,492, and which is incorporated herein by reference in its entirety.

BACKGROUND

[0004] For over a century, signals transmitted by radio waves involved radiation fields launched using conventional antenna structures. In contrast to radio science, electrical power distribution systems in the last century involved the transmission of energy guided along electrical conductors. This understanding of the distinction between radio frequency (RF) and power transmission has existed since the early 1900’s.

SUMMARY

[0005] Embodiments of the present disclosure are related to various receive circuits by which to receive a plurality of guided surface waves transmitted by a plurality of guided surface waveguide probes over a surface of a terrestrial medium.

[0006] In one embodiment, among others, an apparatus comprises a plurality of guided surface waveguide receive structures, each of the plurality of guided surface waveguide receive structures being configured to receive energy in a form

CLAIMS

Therefore, the following is claimed:

1. An apparatus comprising:

a plurality of guided surface waveguide receive structures, each of the plurality of guided surface waveguide receive structures being configured to receive energy in a form of at least one guided surface wave transmitted by at least one guided surface waveguide probe on a surface of a terrestrial medium;

a plurality of impedance matching networks, each of the plurality of impedance matching networks being coupled to a corresponding one of the plurality of guided surface waveguide receive structures;

a plurality of wave rectifiers, each of the plurality of wave rectifiers being coupled to a corresponding one of the plurality of impedance matching networks; and

at least one voltage regulator coupled to a corresponding one of the plurality of wave rectifiers.

2. The apparatus of claim 1, wherein a plurality of outputs of the at least one voltage regulator are coupled in parallel.

3. The apparatus of claim 1, wherein a plurality of outputs of the at least one voltage regulator are coupled in series.

4. The apparatus of claim 1, wherein the at least one guided surface waveguide probe comprises a charge terminal elevated over the terrestrial medium configured to generate at least one resultant field that synthesizes a wave front incident at a complex Brewster angle of incidence ($\theta_{i,B}$) of the terrestrial medium.

5. The apparatus of claim 4, wherein the charge terminal is one of a plurality of charge terminals.

6. The apparatus of claim 4, wherein each of the plurality of guided surface waveguide receive structures receives the energy in the form of the at least one guided surface wave at a frequency of transmission that is unique with respect to all other frequencies of transmission.

7. The apparatus of claim 1, wherein each of the at least one guided surface waveguide probe comprises a feed network electrically coupled to a charge terminal, the feed network providing a phase delay (Φ) that matches a wave tilt angle (Ψ) associated with a complex Brewster angle of incidence ($\theta_{i,B}$) associated with the terrestrial medium in the vicinity of the guided surface waveguide probe.

8. An apparatus comprising:

a tuned resonator comprising a coil and configured to receive power in a form of at least one guided surface wave transmitted by at least one guided surface waveguide probe on a surface of a terrestrial medium;

a plurality of other coils, each of the plurality of other coils being coupled to the coil;

a plurality of isolation circuits, each of the plurality of isolation circuits being coupled via at least one direct tap to the coil;

a plurality of impedance matching networks, each of the plurality of impedance matching networks being coupled to a corresponding one of the other coils;

a plurality of wave rectifiers, each of the plurality of wave rectifiers being coupled to a corresponding one of the impedance matching networks; and

at least one voltage regulator coupled to a corresponding one of the wave rectifiers.

9. The apparatus of claim 8, wherein a plurality of outputs of the at least one voltage regulator are coupled in parallel.

10. The apparatus of claim 8, wherein a plurality of outputs of the at least one voltage regulator are coupled in series.

11. The apparatus of claim 8, wherein each of the plurality of the isolation circuits comprises at least one low-pass filter and at least one high-pass filter.

12. The apparatus of claim 8, wherein each of the plurality of the isolation circuits comprises at least one band-pass filter.

13. The apparatus of claim 8, wherein each of the plurality of the isolation circuits comprises a trap dipole.

14. An apparatus comprising:

a plurality of magnetic coils, each of the plurality of magnetic coils being configured to receive energy in a form of at least one guided surface wave transmitted by at least one guided surface waveguide probe over a terrestrial medium;

a plurality of impedance matching networks, each of the plurality of impedance matching networks being coupled to a corresponding one of the plurality of magnetic coils; and

a plurality of wave rectifiers, each of the plurality of wave rectifiers being coupled to a corresponding one of the impedance matching networks.

15. The apparatus of claim 14, further comprising at least one voltage regulator coupled to at least one wave rectifier among the plurality of wave rectifiers.

16. The apparatus of claim 15, wherein a plurality of outputs of the at least one voltage regulator are coupled in parallel.

17. The apparatus of claim 16, wherein the at least one voltage regulator is coupled to a corresponding one of the plurality of wave rectifiers.

18. The apparatus of claim 15, wherein a plurality of outputs of the at least one voltage regulator are coupled in series.

19. The apparatus of claim 15, wherein the at least one voltage regulator is coupled to each of the plurality of wave rectifiers.

20. A system for receiving energy in the form of at least one guided surface wave transmitted by at least one guided surface waveguide probe on a surface of a terrestrial medium to a load, comprising:

a first guided surface waveguide probe positioned at a first location, the first guided surface waveguide probe generating transmission of a first guided surface wave at a predetermined frequency in a first area;

a second guided surface waveguide probe positioned at a second location, the second guided surface waveguide probe generating transmission of a second guided surface wave at another predetermined frequency in a second area;

at least one receive circuit positioned at a point within the first area and the second area; and

at least one field meter configured to detect a field strength associated with the at least one guided surface wave, the at least one field meter being in communication with a provider.