

CLAIMS

What is claimed is:

1. A system comprising:

at least one first integrated roofing accessory installed on a first roof, wherein the at least one first integrated roofing accessory comprises:

- i) at least one first transceiver configured to produce millimeter wave (mmWave) frequency signals using at least one fifth generation cellular networking (5G) protocol,
- ii) at least one first dielectric antenna in electrical communication with the at least one first transceiver for emitting the mmWave frequency signals according to the at least one 5G protocol,
- iii) a first edge computing device having at least one first processor and at least one first non-transitory storage with first software to operate the first edge computing device in communication with the at least one first transceiver, and
- iv) at least one first power supply;

at least one second integrated roofing accessory installed on a second roof, wherein the at least one second integrated roofing accessory comprises:

- i) at least one second transceiver configured to produce the mmWave frequency signals using the at least one 5G protocol,
- ii) at least one second dielectric antenna in electrical communication with the at least one second transceiver for emitting the mmWave frequency signals according to the at least one 5G protocol,
- iii) a second edge computing device having at least one second processor and at least one second non-transitory storage with second software to operate the second edge computing device in communication with the at least one second transceiver, and
- iv) at least one second power supply;

at least one third integrated roofing accessory installed on a third roof, wherein the at least one third integrated roofing accessory comprises:

- i) at least one third transceiver configured to produce the mmWave frequency signals using the at least one 5G protocol,
- ii) at least one third dielectric antenna in electrical communication with the at least one third transceiver for emitting the mmWave frequency signals according to the at least one 5G protocol,
- iii) a third edge computing device having at least one third processor and at least one third non-transitory storage with third software configured to operate the third edge computing device in communication with the at least one third transceiver, and
- iv) at least one third power supply;

wherein the first software, the second software and the third software are configured to cause, when executed, the at least one first integrated roofing accessory, the at least one second integrated roofing accessory and the at least one third integrated roofing accessory to form a 5G network using the mmWave frequency signals; and

wherein at least one of the first software, the second software, and the third software are further configured to cause, when executed, the 5G network to communicate with at least one computing device.

2. The system of claim 1, wherein at least one of the at least one first integrated roofing accessory, the at least one second integrated roofing accessory, or the at least one third integrated roofing accessory is integrated into at least one modified photovoltaic module.

3. The system of claim 2, wherein the at least one modified photovoltaic module comprises at least one photovoltaic panel.

4. The system of claim 1, wherein at least one of the at least one first transceiver, the at least one second transceiver, or the at least one third transceiver comprises a software-defined radio module.

5. The system of claim 4, wherein the software-defined radio module comprises a virtual firewall.

6. The system of claim 1, wherein the 5G network is defined according to an Open Systems Interconnection (OSI) model.

7. The system of claim 1, wherein the at least one first integrated roofing accessory further comprises:

a compartment, holding:

i) the at least one first transceiver,

ii) the at least one first dielectric antenna, and

iii) the at least one first edge computing device;

wherein a portion of the compartment comprises a roofing material; and

a frame connected to the compartment and to the first roof.

8. The system of claim 7, wherein the compartment extends vertically above the first roof.

9. The system of claim 7, wherein the frame is installed into a ridge vent of the first roof.

10. The system of claim 1, wherein the at least one first integrated roofing accessory further comprises:

a shingle, holding:

i) the at least one first transceiver,

- ii) the at least one first dielectric antenna, and
- iii) the at least one first edge computing device.

11. The system of claim 1, wherein the at least one first dielectric antenna is a plurality of first dielectric antennas.

12. The system of claim 1, wherein the at least one first integrated roofing accessory further comprises:

a siding, holding:

- i) the at least one first transceiver,
- ii) the at least one first dielectric antenna, and
- iii) the at least one first edge computing device.

13. The system of claim 1, wherein at least one of the first software, the second software, or the third software are further configured to cause, when executed, the 5G network to communicate with at least one customer access radio enabled computing device.

14. The system of claim 13, wherein the customer access radio enabled device comprises a WiFi communication module.

15. The system of claim 1:

wherein the at least one first integrated roofing accessory comprises a first data storage device and a first compute device;

wherein the at least one second integrated roofing accessory comprises a second data storage device and a second compute device;

wherein the at least one third integrated roofing accessory comprises a third data storage device and a third compute device; and

wherein the first software, the second software and the third software are configured to cause, when executed, the at least one first integrated roofing accessory, the at least one second integrated roofing accessory and third the plurality of integrated roofing accessories to form a distributed datacenter across the 5G network.

16. The system of claim 1, further comprising a fiber optic connection between a backhaul network and at least one of the at least one first integrated roofing accessory, the at least one second integrated roofing accessory, or the at least one third integrated roofing accessory.

17. The system of claim 1, wherein the 5G network is a mesh network.

18. The system of claim 1, further comprising an array of photovoltaic panels; and

wherein at least one of the at least one first integrated roofing accessory, the at least one second integrated roofing accessory, or the at least one third integrated roofing accessory is powered by the array of photovoltaic panels.

19. The system of claim 1, further comprising a mains power connection via a ridge vent; and

wherein at least one of the at least one first integrated roofing accessory, the at least one second integrated roofing accessory, or the at least one third integrated roofing accessory is powered by the mains power connection.

20. A method comprising:

obtaining a at least one first integrated roofing accessory, comprising:

- i) at least one first transceiver configured to produce millimeter wave (mmWave) frequency signals using at least one fifth generation cellular networking (5G) protocol,
- ii) at least one first dielectric antenna in electrical communication with the at least one first transceiver for emitting the mmWave frequency signals according to the at least one 5G protocol, and
- iii) a first edge computing device having at least one first processor and at least one first non-transitory storage with software;

mounting the at least one first integrated roofing accessory on a first roof;

obtaining at least one second integrated roofing accessory, comprising:

- i) at least one second transceiver configured to produce the mmWave frequency signals using the at least one 5G protocol,
- ii) at least one second dielectric antenna in electrical communication with the at least one second transceiver for emitting the mmWave frequency signals according to the at least one 5G protocol, and
- iii) a second edge computing device having at least one second processor and at least one second non-transitory storage with software;

mounting the at least one second integrated roofing accessory on a second roof;

obtaining at least one third integrated roofing accessory, comprising:

- i) at least one third transceiver configured to produce the mmWave frequency signals using the at least one 5G protocol,
- ii) at least one third dielectric antenna in electrical communication with the at least one third transceiver for emitting the mmWave frequency signals according to the at least one 5G protocol, and
- iii) a third edge computing device having at least one third processor and at least one third non-transitory storage with software;

mounting the at least one third integrated roofing accessory on a third roof;

wherein the first software, the second software and the third software are configured to cause, when executed, the at least one first integrated roofing accessory, the at least one second integrated roofing accessory and third the plurality of integrated roofing accessories to form a 5G network using the mmWave frequency signals; and

wherein at least one of the first software, the second software, and the third software are further configured to cause, when executed, the 5G network to communicate with at least one computing device.

21. The method of claim 20, further comprising integrating at least one of the at least one first integrated roofing accessory, the at least one second integrated roofing accessory, or the at least one third integrated roofing accessory into at least one modified photovoltaic module.

22. The method of claim 21, wherein the at least one modified photovoltaic module comprises at least one photovoltaic panel.

23. The method of claim 20, wherein at least one of the at least one first transceiver, the at least one second transceiver, or the at least one third transceiver comprises software-defined radio module.

24. The method of claim 23, wherein the software-defined radio module comprises a virtual firewall.

25. The method of claim 20, wherein the 5G network is defined according to an Open Methods Interconnection (OSI) model.

26. The method of claim 20, wherein the at least one first integrated roofing accessory further comprises:

a compartment, holding:

- i) the at least one first transceiver,
- ii) the at least one first dielectric antenna, and
- iii) the at least one first edge computing device;

wherein a portion of the compartment comprises a roofing material; and

a frame connected to the compartment and to the first roof.

27. The method of claim 26, wherein the compartment extends vertically above the first roof

28. The method of claim 26, further comprising installing the frame into a ridge vent of the first roof.

29. The method of claim 20, wherein the at least one first integrated roofing accessory further comprises:

a shingle, holding:

- i) the at least one first transceiver,
- ii) the at least one first dielectric antenna, and
- iii) the at least one first edge computing device.

30. A method comprising:

controlling, by at least one first processor of at least one edge computing device of at least one first integrated roofing accessory, at least one first transceiver to produce millimeter wave (mmWave) frequency signals using at least one fifth generation cellular networking (5G) protocol;

wherein the at least one first integrated roofing accessory is installed on a first roof;

controlling, the at least one first transceiver, at least one first dielectric antenna to emit the mmWave frequency signals according to the at least one 5G protocol;

controlling, by at least one second processor of at least one edge computing device of at least one second integrated roofing accessory, at least one second transceiver to produce the mmWave frequency signals using the at least one 5G protocol;

wherein the at least one second integrated roofing accessory is installed on a second roof;

controlling, the at least one second transceiver, at least one second dielectric antenna to emit the mmWave frequency signals according to the at least one 5G protocol;

controlling, by at least one third processor of at least one edge computing device of at least one third integrated roofing accessory, at least one third transceiver to produce the mmWave frequency signals using the at least one 5G protocol;

wherein the at least one third integrated roofing accessory is installed on a third roof;

controlling, the at least one third transceiver, at least one third dielectric antenna to emit the mmWave frequency signals according to the at least one 5G protocol;

producing, by the at least one first processor, the at least one second processor and the at least one third processor, a 5G network using the mmWave frequency signals; and

causing the network to communicate, by the at least one first processor, the at least one second processor and the at least one third processor, with at least one computing device.