

CLAIMS

What is claimed is:

1. An antenna structure, comprising:
 - a primary antenna portion;
 - an auxiliary antenna portion; and
 - a switch coupled to the primary antenna portion and to the auxiliary antenna portion,wherein the switch is coupled to a source,
 - wherein the primary antenna portion operates at a first resonance frequency range,
 - wherein the switch, when enabled in accordance with receiving a signal from the source, provides a conduction channel between the primary antenna portion and the auxiliary antenna portion,
 - wherein the first resonance frequency range of the primary antenna portion is frequency shifted to a second resonance frequency range while the conduction channel is present, and
 - wherein the switch when disabled forms a substantially open circuit between the primary antenna portion and the auxiliary antenna portion, the first resonance frequency range of the primary antenna portion being restored while the open circuit is present.
2. The antenna structure of claim 1, wherein the signal comprises a unidirectional direct current or a first bias voltage having a first polarity.
3. The antenna structure of claim 2, wherein the switch is disabled in accordance with the source removing the unidirectional direct current applied to the switch or the source applying to the switch a second bias voltage having a second polarity.

4. The antenna structure of claim 1, wherein the auxiliary antenna portion electrically extends the primary antenna portion while the conduction channel is present, thereby causing the first resonance frequency range of the primary antenna portion to be frequency shifted to the second resonance frequency range.
5. The antenna structure of claim 1, wherein the first resonance frequency range and the second resonance frequency range correspond respectively to a first tuning state and a second tuning state of a fundamental resonance of the antenna structure.
6. The antenna structure of claim 5, wherein the antenna structure operates at a third resonance frequency range while the conduction channel is present, the third resonance frequency range corresponding to a first harmonic resonance of the antenna structure.
7. The antenna structure of claim 6, further comprising a parasitic resonator portion adjacent to the primary antenna portion, the parasitic resonator portion being tunable to broaden the third resonance frequency range.
8. The antenna structure of claim 1, wherein the switch comprises a diode, and further comprising a capacitor coupled between the primary antenna portion and the auxiliary antenna portion.
9. The antenna structure of claim 8, wherein the auxiliary antenna portion is coupled to an RF feed circuit for transmitting and receiving RF signals, and wherein the RF signals are transmitted and received at the primary antenna portion via the capacitor.
10. The antenna structure of claim 8, wherein the capacitor is coupled to the diode in parallel.

11. An antenna structure, comprising:
 - a primary antenna portion;
 - a first auxiliary antenna portion;
 - a second auxiliary antenna portion;
 - a first switch coupled to the primary antenna portion and to the first auxiliary antenna portion; and
 - a second switch coupled to the primary antenna portion and to the second auxiliary antenna portion,wherein a first portion of the primary antenna portion operates at a first resonance frequency range,
 - wherein the first switch when enabled provides a first conduction channel between the primary antenna portion and the first auxiliary antenna portion,
 - wherein the first resonance frequency range is frequency shifted to a second resonance frequency range while the first conduction channel is present, the first resonance frequency range and the second resonance frequency range corresponding respectively to a first tuning state and a second tuning state of a fundamental resonance of the antenna structure,
 - wherein a second portion of the primary antenna portion operates at a third resonance frequency range, and
 - wherein the first switch when enabled causes the second auxiliary antenna portion to electrically extend the second portion of the primary antenna portion, thereby causing the third resonance frequency range to be frequency shifted to a fourth resonance frequency range, the third resonance frequency range and the fourth resonance frequency range corresponding to tuning states of a first harmonic resonance of the antenna structure.

12. The antenna structure of claim 11, wherein enabling the first switch causes a current in the second portion of the primary antenna portion, thereby enabling the second switch.

13. The antenna structure of claim 12, wherein the first switch and the second switch are diodes, and the current feeds the second switch to enable the second switch to provide a second conduction channel between the primary antenna portion and the second auxiliary antenna portion.

14. The antenna structure of claim 11, wherein the first switch is coupled to a source, and wherein the first switch is enabled in accordance with receiving a signal from the source, the signal comprising a unidirectional direct current or a first bias voltage having a first polarity.

15. The antenna structure of claim 14, wherein the first switch is disabled in accordance with the source removing the unidirectional direct current applied to the switch or the source applying to the switch a second bias voltage having a second polarity, and wherein the first switch when disabled forms a substantially open circuit between the primary antenna portion and the first auxiliary antenna portion, the first resonance frequency range of the first portion of the primary antenna portion being restored while the open circuit is present.

16. A device, comprising:
- an antenna structure comprising a primary antenna portion, an auxiliary antenna portion, and a switch coupled to the primary antenna portion and to the auxiliary antenna portion;
 - a signal source coupled to the switch;
 - a memory to store instructions; and
 - a processor coupled to the signal source and to the memory, wherein responsive to executing the instructions, the processor performs operations comprising:
 - receiving a request to facilitate communications;
 - selecting a first frequency band or a second frequency band for the communications,
 - in accordance with selecting the second frequency band, causing the switch to be enabled; and
 - in accordance with selecting the first frequency band, causing the switch to be disabled,
 - wherein causing the switch to be enabled comprises causing the signal source to generate a first signal causing the switch to provide a conduction channel between the primary antenna portion and the auxiliary antenna portion, wherein a first resonance frequency range of the primary antenna portion is frequency shifted to a second resonance frequency range while the conduction channel is present.
17. The device of claim 16, wherein causing the switch to be disabled comprises causing the signal source to generate a second signal causing the switch to form a substantially open circuit between the primary antenna portion and the auxiliary antenna portion, wherein the first resonance frequency range of the primary antenna portion is restored while the open circuit is present.

18. The device of claim 16, wherein the first signal comprises a unidirectional direct current or a first bias voltage having a first polarity.
19. The device of claim 18, wherein the switch is disabled in accordance with the signal source removing the unidirectional direct current applied to the switch or the signal source applying to the switch a second bias voltage having a second polarity.
20. The device of claim 16, wherein the switch comprises a diode.