

IN THE CLAIMS

Each claim of the present application is set forth below with a parenthetical notation immediately following the claim number indicating the current claim status. The Examiner's entry of the claim amendments under Section 1.121 is respectfully requested.

1. (CURRENTLY AMENDED) An antenna controlled by an antenna controller, the antenna comprising:

a radiating structure;

a plurality of switchable different feed locations, ~~terminal~~ a plurality of switchable different ground locations or a plurality of switchable different feed locations and a plurality of switchable different ground locations disposed on the radiating structure; and

feed switching elements each for connecting one of the switchable feed locations to an antenna feed terminal;

ground switching elements each for connecting one of the switchable ground locations to an antenna ground terminal;

wherein the controller selects one of the feed locations and selects one of the ground locations and controls an associated feed switching element and an associated ground switching element to a conductive condition ~~plurality of terminal locations~~ for controlling an antenna impedance.

2. (CANCELLED)

3. (CANCELLED)

4. (CURRENTLY AMENDED) An apparatus comprising:
an antenna for transmitting signals, the antenna having an input impedance;
a power amplifier supplying a first signal to the antenna for transmitting; ~~and~~
an impedance transformer connected between the antenna and the power amplifier, the transformer for transforming an output impedance of the power amplifier to substantially the input impedance, wherein the output impedance of the power amplifier varies according to an output power of the power amplifier.

~~a controller for controlling the input impedance.~~

5. (CANCELLED)

6. (CURRENTLY AMENDED) The apparatus of ~~claim 4~~ claim 10 further ~~comprising a module for determining an efficiency of the power amplifier, wherein the operating parameter of the power amplifier comprises~~ controller controls the input impedance responsive to the a power amplifier efficiency, a power amplifier output impedance or a power amplifier output power.

7. (CANCELLED)

8 (CANCELLED)

9. (CANCELLED)

10. (CURRENTLY AMENDED) A wireless communications device comprising:

an antenna for transmitting signals, the antenna having an input impedance;

a power amplifier supplying a first signal to the antenna for transmitting; and

a controller for ~~controlling~~ establishing the input impedance responsive to an operating parameter of the power amplifier or responsive to a characteristic of the first signal. ~~responsive to a power level of the first signal.~~

11. (CURRENTLY AMENDED) The wireless communications device of claim 10 wherein the characteristic of the first signal comprises ~~input impedance is controlled to a predetermined impedance value responsive to a power level~~ or a standing wave ratio of the first signal.

12. (ORIGINAL) The wireless communications device of claim 10 wherein the input impedance is controlled to maintain the input impedance between a first and a second value.

13. (CURRENTLY AMENDED) The wireless communications device of claim 10 wherein the characteristic of the first signal comprises a power level or a standing wave ration, and wherein the input impedance is continuously controlled ~~responsive to the power level of the first signal~~ to maintain the power level substantially at a predetermined power level.

14. (ORIGINAL) The wireless communications device of claim 10 wherein an efficiency of the power amplifier increases responsive to the controller controlling the input impedance.

15. (CURRENTLY AMENDED) The wireless communications device of claim 10 wherein the antenna further comprises a radiating element and a feed terminal connected thereto, and wherein the controller controls an operating parameter of the antenna comprising a location of the feed terminal on ~~relative to~~ the radiating element, ~~to control the input impedance.~~

16. (CURRENTLY AMENDED) The wireless communications device of claim 10 wherein the antenna further comprises a radiating element and a ground terminal connected between the radiating element and a ground, and wherein the controller controls an operating parameter of the antenna comprising a location of the ground terminal on ~~relative to~~ the radiating element, ~~to control the input impedance.~~

17. (CURRENTLY AMENDED) The wireless communications device of claim 10 wherein the antenna further comprises a radiating element, a feed terminal connected to the radiating element and a ground terminal connected between the radiating element and a ground, and wherein the controller controls a distance between the feed terminal and the ground terminal or a location of one or both of the feed terminal and the ground terminal. ~~to control the input impedance.~~

18. (CURRENTLY AMENDED) The wireless communications device of claim 10 further comprising transmitting circuits for producing an information signal supplied to the power amplifier, wherein the power amplifier supplies the first signal in response to the information signal, and wherein the transmitting circuits produce a control ~~second~~-signal input to the controller for use by the controller to establish ~~control~~ the input impedance.

19. (CURRENTLY AMENDED) The wireless communications device of claim 10 wherein the power amplifier supplies a control ~~second~~-signal to the controller for use by the controller to control the input impedance, wherein the control ~~second~~ signal represents an operating parameter of the power amplifier or a characteristic of the first signal.

20. (CURRENTLY AMENDED) The wireless communications device of claim ~~10~~ 19 wherein the ~~operating parameter comprises~~ characteristic of the first signal ~~comprises~~ one of the power level of the first signal, an output impedance of the power amplifier and a voltage standing wave ratio of the first signal.

21. (ORIGINAL) The wireless communications device of claim 10 wherein the controller controls a resonant frequency of the antenna.

22. (ORIGINAL) The wireless communications device of claim 10 wherein the antenna comprises a radiating element and the controller controls an effective electrical length of the radiating element to control a resonant frequency of the antenna.

23. (ORIGINAL) The wireless communications device of claim 22 wherein the radiating element comprises a plurality of radiating segments, and wherein the controller selects one or more of the plurality of radiating segments to control the resonant frequency of the antenna.

24. (ORIGINAL) The wireless communications device of claim 10 wherein the antenna comprises a plurality of meanderline segments, and wherein the controller selects one or more of the plurality of meanderline segments to control a resonant frequency of the antenna.

25. (ORIGINAL) The wireless communications device of claim 10 further comprising a manually operated control element for controlling the input impedance in response to manual manipulation of the control element.

26. (ORIGINAL) The wireless communications device of claim 10 further comprising a manually operated control element for controlling an antenna resonant frequency in response to manual manipulation of the control element.

27. (CURRENTLY AMENDED) An apparatus comprising:

an antenna for transmitting a signal;

a radio frequency probe detector for determining a power frequency of the signal in a near field region of the antenna; and

a controller for frequency tuning the antenna in response to the power of the signal to increase the power as determined by the probe frequency.

28. (CURRENTLY AMENDED) The apparatus of claim 27 wherein the antenna comprises a radiating element and the controller controls a length or a reactance of the radiating element to control a resonant frequency of the antenna.

29. (CANCELLED)

30. (CANCELLED)

31. (ORIGINAL) The apparatus of claim 27 wherein the antenna comprises a radiating structure comprising multiple radiating segments with a parasitic capacitance between multiple radiating segments, and wherein the controller modifies at least one of the parasitic capacitances to tune the antenna.

32. (CANCELLED)

33. (CANCELLED)

34. (ORIGINAL) The apparatus of claim 27 further comprising a manually operated control element for controlling the antenna resonant frequency in response to manual manipulation of the control element.

35. (CURRENTLY AMENDED) An apparatus comprising:
transmitting circuits for producing a signal having a frequency in a selected one of a plurality of frequency bands, the signal to be transmitted;
a power amplifier for amplifying the signal;
a multiband antenna responsive to an amplified signal and selectively operable in any one of the a plurality of frequency bands, ~~the antenna responsive to the transmitting circuits~~ for transmitting the amplified signal; and
a controller ~~for determining the frequency and~~ for controlling the antenna to have a resonant frequency ~~operate in the~~ selected one of the plurality of frequency bands ~~including the frequency.~~ and further for controlling an antenna impedance responsive to a power amplifier efficiency, to a power amplifier output impedance or to a power amplifier output power.

36. (CANCELLED)

37. (CANCELLED)

38. (CURRENTLY AMENDED) A communications device comprising:
an antenna for operating at a desired ~~having a~~ resonant frequency;
a proximate sensor; and
a controller responsive to the proximate sensor for tuning the antenna to the desired resonant frequency when a proximate object detected by the proximate sensor detunes the antenna from the desired resonant frequency.

39. (ORIGINAL) The communications device of claim 38 wherein the proximate object comprises a hand of a communications device user.

40. (CURRENTLY AMENDED) An apparatus comprising:
an antenna having a resonant frequency and an impedance, the antenna comprising:

- a radiating element;
- a feed terminal;
- a ground terminal; and

a power amplifier for supplying a signal to the antenna, the signal for transmission;

an element for determining a signal characteristic or a power amplifier operating characteristic;

a controller for modifying ~~physical characteristics of~~ one or more of the radiating element, the feed terminal and the ground terminal to modify one or both of the resonant frequency and the impedance responsive to the signal characteristic or to the power amplifier operating characteristic.

41. (CANCELLED)

42. (CANCELLED)

43. (CURRENTLY AMENDED) The apparatus of claim 40 having a first volume smaller than a second volume of an antenna lacking modifiable resonant frequency or ~~and~~ impedance.

44. (CURRENTLY AMENDED) The apparatus of claim 40 further comprising a plurality of switching elements controlled by the controller, wherein the radiating element, the feed terminal, and the ground terminal ~~antenna elements~~ are configurable in response to a condition ~~position~~ of the plurality of switching elements ~~switches~~ for modifying one or both ~~more~~ of the ~~physical characteristics.~~ resonant frequency and the impedance.

45. (CURRENTLY AMENDED) A first communications device having a first antenna with a first volume and a second communications device having a second antenna with a second volume greater than the first volume, the first ~~communications device comprising an~~ antenna having modifiable ~~physical~~ characteristics, the first antenna further comprising:

antenna elements for receiving and transmitting an information signal;

~~an~~ measuring element for determining a signal quality metric; and

a controller for modifying one or more of the ~~physical~~ characteristics to improve ~~antenna performance~~ of the first communications device, wherein the controller is responsive to the measuring element for modifying one or more of the ~~physical~~ characteristics in response to a determined signal quality metric, wherein the first and the second communications device can receive signals in the same frequency band, and wherein the first and the second communications devices operate with substantially the same efficiency.

46. (CANCELLED)

47. (CANCELLED)

48. (CANCELLED)

49. (CANCELLED)

50. (CURRENTLY AMENDED) A method for controlling a communications device comprising a power amplifier for supplying a signal to ~~and~~ an antenna, the method comprising:

determining an operating parameter of the power amplifier; and

controlling an operating parameter of the antenna responsive to a determined operating parameter of the power amplifier.

51. (CURRENTLY AMENDED) The method of claim 50 wherein the operating parameter of the power amplifier comprises a power amplifier efficiency, a power amplifier output impedance or a ~~signal power of a signal supplied by the power amplifier~~ output power . ~~to the antenna.~~

52. (CURRENTLY AMENDED) The method of claim 50 wherein the operating parameter of the antenna comprises an antenna input impedance, ~~or an antenna resonant frequency.~~

53. (CURRENTLY AMENDED) A method for controlling an antenna impedance parameters, comprising:

determining a desired antenna input impedance; and

connecting a first region on an antenna radiating structure to ground through a ground switching element, wherein a plurality of regions on the radiating structure can be switchably connected to ground through a like plurality of ground switching elements;

connecting a second region on the antenna radiating structure to a feed terminal through a feed switching element, wherein a plurality of regions on the radiating structure can be switchably connected to the feed terminal through a like plurality of feed switching elements; and

wherein the first and the second regions are selected ~~controlling antenna elements~~ to achieve the desired antenna input impedance.

54. (CANCELLED)

55. (CURRENTLY AMENDED) A method for controlling antenna parameters, comprising:

determining that the antenna is not operating at ~~has been detuned from~~ a desired antenna resonant frequency; and

controlling a first parasitic capacitance between a radiating structure of the antenna and ground by controlling a first capacitance presented by a first varactor diode connected between the radiating structure and ground, the first capacitance responsive to a first DC voltage applied to the first varactor diode;

controlling a second parasitic capacitance between a first region and a second region of the radiating structure by controlling a second capacitance presented by a second varactor diode connected between the first and the second regions, the second capacitance responsive to a second DC voltage applied to the second varactor diode;

wherein the first and the second DC voltages are selected ~~controlling antenna elements~~ to achieve the desired antenna resonant frequency.

56. (NEW) The apparatus of claim 38 wherein the antenna comprises a radiating element and the controller controls a length or a reactance of the radiating element for tuning the antenna to the desired resonant frequency.

57. (NEW) The apparatus of claim 38 wherein the antenna comprises a radiating structure comprising multiple radiating segments with a parasitic capacitance between multiple radiating segments, and wherein the controller modifies at least one of the parasitic capacitances element for tuning the antenna to the desired resonant frequency.

58. (NEW) The apparatus of claim 57 wherein the multiple radiating segments each comprise a varactor diode, and wherein the controller applies a voltage to the varactor diode to change a capacitance thereof and thereby modify at least one of the parasitic capacitances element for tuning the antenna to the desired resonant frequency.