

What is claimed is:

1. A method of providing measurements of one or more channels of an unlicensed radio spectrum ~~a WiFi network~~ to a cellular radio network, the method comprising:

preparing, at a node (28) of the cellular radio network, a request for measurement of at least one ~~WiFi channel (S100)~~ of the unlicensed radio spectrum, the measurement to be provided by at least one user equipment (32) having an unlicensed radio spectrum ~~a WiFi~~ transceiver (38) and a cellular radio transceiver (36), the at least one ~~WiFi channel~~ being selected from ~~a list of WiFi channels reported by~~ associated with at least one of the at least one user equipment (32);

transmitting, from the node (28) of the cellular radio network, the request to the at least one user equipment (32, S102); and

receiving, at the node (28) of the cellular radio network, from the at least one user equipment (32), at least one measurement of the at least one ~~WiFi channel (S104)~~ of the unlicensed spectrum.

2. The method of Claim 1, wherein the measurement is a received signal strength indication, RSSI.

3. The method of Claim 1, wherein the measurement is a received channel power indication, RCPI, the method further comprising converting the RCPI into units of at least one of dBm and mW.

4. The method of Claim 1, wherein the node (28) of the cellular radio network is a long term evolution, LTE, base station.

5. The method of claim 4, wherein the unlicensed radio spectrum channel is a WiFi channel.

~~5. The method of Claim 1, further comprising performing, at the node (28) of the cellular radio network, a power saving function based on the at least one measurement, the power saving function instructing a user equipment (32) cellular radio transceiver (36) to enter a sleep mode.~~

6. ~~— The method of Claim 1, further comprising performing, at the node (28) of the cellular radio network, a WiFi network mapping function based on the at least one measurements (S106), the network mapping function include creating a list of WiFi channels accessible by at least one user equipments (32).~~

7.6. The method of Claim 1, further comprising performing, at the node (28) of the cellular radio network, a user equipment (32) handoff function based on the at least one measurements (S106); and/or:

8. ~~— The method of Claim 7, wherein the user equipment (32) handoff function includes discontinuing allocation of a cellular radio network channel to a user equipment (32).~~

9. ~~— The method of Claim 1, further comprising comparing, at the node (28) of the cellular radio network, the at least one measurement to at least one threshold to determine when a WiFi channel quality of the unlicensed spectrum is greater than a cellular radio channel quality.~~

7. A method for acquiring and transmitting a channel measurement at a user equipment (32) in response to a request from a cellular radio network, the method comprising:

receiving, at a cellular radio transceiver (36) of the user equipment (32), a request from a cellular radio base station requesting the user equipment (32) to measure at least one channel (S108), from unlicensed radio spectrum channels associated with the user equipment (32);

receiving (S112), at a unlicensed radio spectrum transceiver (38) of the user equipment (32), signals on the at least one channel of the unlicensed radio spectrum;

processing the received signals to determine a measurement of at least one channel (S114) of the unlicensed radio spectrum; and

transmitting the measurement to the cellular radio base station via the cellular radio transceiver (36; S116).

8. A computer program product stored in a computer-readable medium, the computer program product containing instructions, which, when executed, cause a processing element to perform steps in a method according to any of Claims 1 to 7.

10.9. A cellular radio network node (28) configured to process signals compatible with a cellular radio network protocol, the cellular radio network node (28) comprising:

a memory (46) configured to store:

an identification of at least one user equipment (50); and

at least one measurement of a ~~WiFi~~ an unlicensed radio spectrum channel (52) received from at least one of the at least one user equipment (32);

a cellular radio transceiver (44) configured to:

send a request for measurement of at least one ~~WiFi~~ channel of the unlicensed radio spectrum to the at least one identified user equipment (32, S102), the at least one ~~WiFi~~ channel being selected from a ~~list of WiFi channels~~ of the unlicensed radio spectrum ~~reported by associated with~~ at least one of the at least one user equipment (32); and

receive from the at least one identified user equipment (32) at least one ~~WiFi~~ unlicensed radio spectrum channel measurement (S104); and

a processor (48) in communication with the memory and the cellular radio transceiver, the processor (48) configured to;

generate the request for measurement (S100);

cause the cellular radio transceiver to send the request for measurement of at least one ~~WiFi~~ unlicensed radio spectrum channel to the at least one identified user equipment (32, S102); and

cause the memory to store the at least one measurement of the ~~WiFi~~ unlicensed radio spectrum channel received from the at least one of the at least one user equipment (32, S104).

11. — The cellular radio network node of Claim 10, wherein the processor (48) is further configured to perform a power saving function (56) based on the at least one ~~WiFi~~ channel measurement, the power saving function (56) including causing the cellular radio transceiver (44) to send an instruction to a user equipment (32) cellular radio transceiver (36) to enter a sleep mode.

12. — The cellular radio network node of Claim 10, wherein the processor (48) is further configured to perform a ~~WiFi~~ network mapping function (58), the network mapping function (58) including creating a list of ~~WiFi~~ channels accessible by at least one user equipments (32).

~~1310.~~ The cellular radio network node of Claim ~~109~~, wherein the processor (48) is further configured to perform a user equipment handoff function (60).

~~1411.~~ The cellular radio network node of Claim 10, wherein the request for measurement specifies at least one WiFi-~~unlicensed radio spectrum~~ channel to be measured (S102)-and/or

~~15.~~—(Cancelled).

~~16.~~—The cellular radio network node of Claim ~~10~~, wherein the processor (48) is embedded in a radio resource controller (34) of a long term evolution, LTE, base station.

12. The cellular radio network node of claim 11, wherein the unlicensed radio spectrum channel is a WiFi channel.

~~1713.~~ A user equipment (32), comprising:

a cellular radio unit (36) configured to:

~~transmit a list of WiFi channels to a cellular radio base station;~~

receive a request from the cellular radio base station requesting the user equipment to measure at least one WiFi channel (S108)), ~~the at least one WiFi channel being from the list of WiFi channels~~ of unlicensed radio spectrum associated with reported by the user equipment (32); and

transmit to the cellular radio base station a report having the measurement of the at least one WiFi channel (S116)of the unlicensed spectrum; and
a ~~WiFi-an unlicensed radio spectrum transceiver (38) configured to;~~

~~receive signals from a WiFi access point (30, S112)~~on the at least one channel of the unlicensed radio spectrum; and

process the received signals to determine a measurement of at least one WiFi channel (S114) of the unlicensed radio spectrum; and

an interface (40) to facilitate communications between the cellular radio unit and the WiFi-~~unlicensed radio spectrum~~ transceiver.

~~1814.~~ The user equipment of Claim ~~137~~, wherein the report having the measurement is generated in the WiFi-~~unlicensed radio spectrum~~ transceiver (38)-or

~~19. The user equipment of Claim 17, wherein the report having the measurement is generated in the cellular radio unit (36).~~

15. The user equipment of claim 14, wherein the unlicensed radio spectrum channel is a WiFi channel.

~~20. (Cancelled).~~

~~21. The user equipment of Claim 17, wherein the request includes a list of WiFi channels to be measured.~~