

# CPC COOPERATIVE PATENT CLASSIFICATION

**H04W WIRELESS COMMUNICATIONS NETWORKS** (radio transmission systems [H04B 7/00](#); transmission systems using electromagnetic waves other than radio waves, e.g. light, infrared [H04B 10/00](#); communication systems using wireless extensions, i.e. wireless links without selective communication, e.g. cordless telephones [H04M 1/72](#); broadcast communication [H04H](#))

## NOTES

1. This subclass covers :
  - communication networks for selectively establishing one or a plurality of wireless communication links between a desired number of users or between users and network equipment, for the purpose of transferring information via these wireless communication links;
  - networks deploying an infrastructure for mobility management of wireless users connected thereto, e.g. cellular networks, WLAN [Wireless Local Area Network], wireless access networks, e.g. WLL [Wireless Local Loop] or self-organising wireless communication networks, e.g. ad hoc networks;
  - planning or deployment specially adapted for the above-mentioned wireless networks;
  - services or facilities specially adapted for the above-mentioned wireless networks;
  - arrangements or techniques specially adapted for the operation of the above-mentioned wireless networks.
2. This subclass does not cover :
  - communication systems using wireless extensions, i.e. wireless links without selective communication, e.g. cordless telephones, which are covered by group [H04M 1/72](#);
  - broadcast communication, which is covered by subclass [H04H](#).
3. In this subclass, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.

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| 4/00 | <p><b>{Mobile application} services or facilities specially adapted for wireless communication networks</b> {(wireless network security <a href="#">H04W 12/00</a>; arrangements for broadcast or conference <a href="#">H04L 12/18</a>; message switching systems <a href="#">H04L 51/00</a>; network arrangements or network protocols for addressing or naming <a href="#">H04L 61/00</a>; network architectures or network communication protocols for network security <a href="#">H04L 63/00</a>; network arrangements or protocols for real-time communications <a href="#">H04L 65/00</a>; network arrangements or communication protocols for networked applications <a href="#">H04L 67/00</a>; application independent communication protocol aspects and techniques in packet data networks <a href="#">H04L 69/00</a>; telephonic communication, substation extension arrangements, cordless telephones, portable communication terminals with improved user interface to control a main telephone operation mode or to indicate the communication status <a href="#">H04M 1/72522</a>; automatic or semi-automatic exchanges for telephonic communication - systems providing special services or facilities to subscribers <a href="#">H04M 3/42</a>)}</p> | 4/001 | <ul style="list-style-type: none"> <li>• {Provisioning or reconfiguring application services, e.g. OMA DM (program loading or initiating <a href="#">G06F 9/445</a>; mobile agents <a href="#">G06F 9/4862</a>; network management <a href="#">H04L 41/00</a>; network arrangements or communication protocols for networked applications involving the movement of software or configuration parameters, e.g. applets <a href="#">H04L 67/34</a>)}</li> </ul>   |
|      |   | 4/003 | <ul style="list-style-type: none"> <li>• {Mobile application execution environments for application services, e.g. communicating with application store or appstore servers in the application service network and <i>vice versa</i>, 3GPP SIM Application toolkit [SAT], 3GPP OSA or 3GPP MEXE (processing of user or subscriber data at user equipment or user record carrier <a href="#">H04W 8/183</a>)}</li> </ul>  |
|      |   | 4/005 | <ul style="list-style-type: none"> <li>• {for Machine-to-Machine communication [M2M, MTC], e.g. 3GPP M2M, OMA M2M, 3GPP MTC or Wireless Sensor Networks [WSN] (self-organizing networks <a href="#">H04W 84/18</a>; network arrangements or communication protocols for networked applications adapted for proprietary or special purpose networking environments, e.g. medical networks, sensor networks, networks in a car, remote metering networks <a href="#">H04L 67/12</a>; mechanical means for transferring the output of a sensing member <a href="#">G01D 5/00</a>)}</li> </ul> |
|      |   | 4/006 | <ul style="list-style-type: none"> <li>• {using cooperative applications for harvesting, aggregating or forwarding data, e.g. data fusion, aggregation or diffusion in WSN, master/slave node hierarchy negotiations in WSN}</li> </ul>  |
|      |   | 4/008 | <ul style="list-style-type: none"> <li>• {using short range communication, e.g. NFC, RFID or PAN (telephonic substation extension arrangements interfacing with an external accessory using a two-way short-range wireless interface <a href="#">H04M 1/7253</a>; mechanical means for transferring the output of a sensing member <a href="#">G01D 5/00</a>; near-field transmission systems <a href="#">H04B 5/00</a>)}</li> </ul>   |

## NOTES

1. This groups covers mobile application services or application service signalling for communication over wireless networks.
2. This group focuses on application services specially adapted for wireless networks or adjusted to the wireless environment

- 4/02 . {Mobile application} Services making use of the location of users or terminals {, e.g. OMA SUPL, OMA MLP or 3GPP LCS} (mobility data transfer [H04W 8/08](#); access restriction based on user location or mobility data [H04W 48/04](#); registration, e.g. affiliation to network, de-registration, e.g. terminating affiliation [H04W 60/00](#); locating users or terminals for network management purpose [H04W 64/00](#); navigation or navigational instruments [G01C 21/00](#); radio direction-finding, radio navigation, determining distance or velocity by use of radio waves, locating or presence-detecting by use of the reflection or re-radiation of radio waves or analogous arrangements using other waves [G01S](#))
- 4/021 . . {based on location controlled areas, e.g. geofencing}
- 4/022 . . . {with dynamic range variability}
- 4/023 . . {using mutual or relative location information between multiple location based services [LBS] targets or of distance thresholds}
- 4/025 . . {using location based information parameters}
- 4/026 . . . {using orientation information, e.g. compass}
- 4/027 . . . {using movement velocity, acceleration information}
- 4/028 . . . {using historical or predicted position information, e.g. trajectory data}
- 4/04 . . {using association of physical positions and logical data} in a dedicated environment, e.g. buildings or vehicles
- 4/043 . . . {using ambient awareness, e.g. involving buildings using floor or room numbers}
- 4/046 . . . {involving vehicles, e.g. floating traffic data [FTD] or vehicle traffic prediction}
- 4/06 . Selective distribution or broadcast {application services; Mobile application} services to user groups; One-way selective calling services {(connection management for selective distribution or broadcast [H04W 76/002](#); resource management for broadcast services [H04W 72/005](#))}
- 4/08 . . User group management {(group management mechanisms in peer-to-peer network applications [H04L 67/1044](#); processing of subscriber group data [H04W 8/186](#))}
- 4/10 . . Push-to-Talk {mobile application services} or Push-on-Call {mobile application} services {(arrangements for real-time multimedia Push-to-X-Services [H04L 65/4061](#); connection management for Push-to-Talk or Push-on-Call services [H04W 76/005](#))}
- 4/12 . {Mobile application service signalling using} messaging, e.g. SMS [Short Message Service]; {Mobile application service signalling using} mailboxes; {Mobile application service signalling using} announcements, e.g. informing users on the status or progress of a communication request {(message switching systems [H04L 51/00](#); voice mail systems [H04M 3/533](#); arrangements for providing announcements [H04M 3/487](#))}
- 4/14 . . {Mobile application service signalling using} short messaging services, e.g. SMS or USSD [Unstructured Supplementary Service Data]
- 4/16 . {Mobile application service signalling using} communication-related supplementary services, e.g. call-transfer or call-hold {(automatic or semi-automatic exchange systems providing special services or facilities to subscribers [H04M 3/42](#))}
- 4/18 . {Customizing content of application services or} information format or content conversion, e.g. adaptation by the network of the transmitted or received information for the purpose of wireless delivery to users or terminals {(message adaptation based on network or terminal capabilities for message switching systems [H04L 51/06](#); network arrangements or communication protocols for networked applications involving intermediate processing or storage in the network, e.g. proxy, [H04L 67/28](#);)}
- 4/185 . . {by embedding added-value information into content, e.g. geo-tagging (intermediate arrangements for adding application control or application functional data [H04L 67/2804](#))}
- 4/20 . {Signalling of application services or} auxiliary data signalling, i.e. transmitting data via a non-traffic channel
- 4/203 . . {for converged personal network application service interworking, e.g. OMA converged personal network services [CPNS]}
- 4/206 . . {for socializing or targeting users of the same wireless application service, e.g. joint gesture signalling or mobile advertising signalling (marketing [G06Q 30/02](#); input arrangements for transferring data to be processed into a form capable of being handled by the computer for entering handwritten data [G06F 3/04883](#))}
- 4/22 . {Mobile application service} emergency connection handling {or mobile application services handling urgent or hazardous situations, e.g. 3GPP earthquake and tsunami warning system [ETWS] (connection management for emergency connection handling [H04W 76/007](#); centralised arrangements for answering calls for emergency applications requiring operator intervention [H04M 3/5116](#))}
- 4/24 . Accounting or billing
- 4/26 . . Usage measurement
- 8/00 Network data management**
- 8/005 . {Discovery of network devices, e.g. terminals}
- 8/02 . Processing of mobility data, e.g. registration information at HLR [Home Location Register] or VLR [Visitor Location Register]; Transfer of mobility data, e.g. between HLR, VLR or external networks
- 8/04 . . Registration at HLR or HSS [Home Subscriber Server]
- 8/06 . . Registration at serving network Location Register, VLR or user mobility server
- 8/065 . . . {involving selection of the user mobility server}
- 8/08 . . Mobility data transfer
- 8/082 . . . {for traffic bypassing of mobility servers, e.g. location registers, home PLMNs or home agents}
- 8/085 . . . {involving hierarchical organized mobility servers, e.g. hierarchical mobile IP [HMIP]}
- 8/087 . . . {for preserving data network PoA address despite hand-offs}
- 8/10 . . . between location register and external networks

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| 8/12         | . . . between location registers or mobility servers  | 24/06        | . Testing, {supervising or monitoring} using simulated traffic   |
| 8/14         | . . . between corresponding nodes   | 24/08        | . Testing, {supervising or monitoring} using real traffic  |
| 8/16         | . . . selectively restricting mobility {data} tracking  | 24/10        | . Scheduling measurement reports; {Arrangements for measurement reports}   |
| 8/18         | . Processing of user or subscriber data, e.g. subscribed services, user preferences or user profiles; Transfer of user or subscriber data                             |              |  |
| 8/183        | . . {Processing at user equipment or user record carrier}   | <b>28/00</b> | <b>Network traffic or resource management</b>  |
| 8/186        | . . {Processing of subscriber group data}   | 28/02        | . Traffic management, e.g. flow control or congestion control  |
| 8/20         | . . Transfer of user or subscriber data   | 28/0205      | . . {at the air interface (dynamic wireless traffic scheduling <a href="#">H04W 72/12</a> )}   |
| 8/205        | . . . {Transfer to or from user equipment or user record carrier}   | 28/021       | . . {in wireless networks with changing topologies, e.g. ad-hoc networks (self-organizing networks <a href="#">H04W 84/18</a> )}   |
| 8/22         | . Processing or transfer of terminal data, e.g. status or physical capabilities   | 28/0215      | . . {based on user or device properties, e.g. MTC-capable devices (mobile application services or facilities specially adapted for wireless communication networks for machine-to-machine communication <a href="#">H04W 4/005</a> ; wireless resource selection or allocation plan definition based on terminal or device properties <a href="#">H04W 72/048</a> )} |
| 8/24         | . . Transfer of terminal data   |              |  |
| 8/245        | . . . {from a network towards a terminal}   | 28/0221      | . . . {power availability or consumption}  |
| 8/26         | . Network addressing or numbering for mobility support  | 28/0226      | . . {based on location or mobility (handoff or reselection <a href="#">H04W 36/00</a> ; mobile application services making use of the location of users or terminals <a href="#">H04W 4/02</a> )}  |
| 8/265        | . . {for initial activation of new user}  | 28/0231      | . . {based on communication conditions (dynamic wireless traffic scheduling definition based on channel quality criteria <a href="#">H04W 72/1226</a> )}   |
| 8/28         | . . Number portability; {Network address portability}   | 28/0236      | . . . {radio quality, e.g. interference, losses or delay}  |
| 8/30         | . Network data restoration; {Network data reliability; Network data fault tolerance}  | 28/0242      | . . . {Determining whether packet losses are due to overload or to deterioration of radio communication conditions}  |
| <b>12/00</b> | <b>Security arrangements, e.g. access security or fraud detection; Authentication, e.g. verifying user identity or authorisation; Protecting privacy or anonymity</b> | 28/0247      | . . {based on conditions of the access network or the infrastructure network (central resource management <a href="#">H04W 28/16</a> )}  |
| 12/02        | . Protecting privacy or anonymity   | 28/0252      | . . {per individual bearer or channel (dynamic wireless traffic scheduling <a href="#">H04W 72/12</a> )}   |
| 12/04        | . Key management  | 28/0257      | . . . {the individual bearer or channel having a maximum bit rate or a bit rate guarantee}   |
| 12/06        | . Authentication  | 28/0263      | . . . {involving mapping traffic to individual bearers or channels, e.g. traffic flow template [TFT]}  |
| 12/08        | . Access security   | 28/0268      | . . {using specific QoS parameters for wireless networks, e.g. QoS class identifier [QCI] or guaranteed bit rate [GBR] (negotiating SLA or negotiating QoS <a href="#">H04W 28/24</a> )}   |
| 12/10        | . Integrity   | 28/0273      | . . {adapting protocols for flow control or congestion control to wireless environment, e.g. adapting transmission control protocol [TCP] (wireless network protocols or protocol adaptations to wireless operation, e.g. wireless application protocol <a href="#">H04W 80/00</a> )}  |
| 12/12        | . Fraud detection   | 28/0278      | . . {using buffer status reports (dynamic wireless traffic scheduling definition <a href="#">H04W 72/1205</a> )}   |
| <b>16/00</b> | <b>Network planning, e.g. coverage or traffic planning tools; Network deployment, e.g. resource partitioning or cells structures</b>                                  | 28/0284      | . . {detecting congestion or overload during communication (monitoring arrangements <a href="#">H04L 43/00</a> )}  |
| 16/02        | . Resource partitioning among network components, e.g. reuse partitioning   | 28/0289      | . . {Congestion control (performing reselection for handling the traffic <a href="#">H04W 36/22</a> ; load shedding arrangements in network planning <a href="#">H04W 16/08</a> ; dynamic wireless traffic scheduling <a href="#">H04W 72/12</a> )}  |
| 16/04        | . . Traffic adaptive resource partitioning  |              |  |
| 16/06        | . . Hybrid resource partitioning, e.g. channel borrowing  |              |  |
| 16/08        | . . . Load shedding arrangements  |              |  |
| 16/10        | . . Dynamic resource partitioning   |              |  |
| 16/12        | . . Fixed resource partitioning   |              |  |
| 16/14        | . Spectrum sharing arrangements {between different networks}  |              |  |
| 16/16        | . . for PBS [Private Base Station] arrangements   |              |  |
| 16/18        | . Network planning tools  |              |  |
| 16/20        | . . for indoor coverage or short range network deployment   |              |  |
| 16/22        | . Traffic simulation tools or models  |              |  |
| 16/225       | . . {for indoor or short range network}   |              |  |
| 16/24        | . Cell structures   |              |  |
| 16/26        | . . Cell enhancers {or enhancement}, e.g. for tunnels, building shadow  |              |  |
| 16/28        | . . using beam steering   |              |  |
| 16/30        | . . Special cell shapes, e.g. doughnuts or ring cells   |              |  |
| 16/32        | . . Hierarchical cell structures  |              |  |
| <b>24/00</b> | <b>Supervisory, monitoring or testing arrangements</b>  |              |  |
| 24/02        | . Arrangements for optimizing operational condition   |              |  |
| 24/04        | . Arrangements for maintaining operational condition  |              |  |

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| 28/0294      | . . {forcing collision (non-scheduled or contention based wireless access channel <a href="#">H04W 74/08</a> )}   | 36/0072      | . . . {of resource information of target access point}   |
| 28/04        | . . Error control {, e.g. treating errors, collisions, noise or interference (arrangements for detecting or preventing errors in the information received <a href="#">H04L 1/00</a> )}  | 36/0077      | . . . {of access information of target access point}   |
| 28/042       | . . . {Treating collisions}   | 36/0083      | . . {Determination of parameters used for hand-off, e.g. generation or modification of neighbour cell lists}                   |
| 28/044       | . . . . {Collision avoidance}   | 36/0088      | . . . {Scheduling hand-off measurements}   |
| 28/046       | . . . . {Collision detection}   | 36/0094      | . . . {Definition of hand-off measurement parameters}  |
| 28/048       | . . . {Treating noise or interference (means associated with receiver for limiting or suppressing noise or interference induced by transmission <a href="#">H04B 1/10</a> ; baseband systems or shaping networks in transmitter or receiver <a href="#">H04L 25/03</a> )}   | 36/02        | . Buffering or recovering information during reselection; {Modification of the traffic flow during hand-off}                   |
| 28/06        | . . Optimizing {the usage of the radio link}, e.g. header compression, information sizing {, discarding information (system modifying transmission characteristic according to link quality by modifying frame length <a href="#">H04L 1/0007</a> ; dynamic adaptation of the packet size for flow control or congestion control <a href="#">H04L 47/365</a> )} | 36/023       | . . {Buffering or recovering information during reselection}   |
| 28/065       | . . . {using assembly or disassembly of packets}  | 36/026       | . . {Multicasting of data during hand-off}   |
| 28/08        | . . Load balancing or load distribution   | 36/04        | . Reselecting a cell layer in multi-layered cells  |
| 28/085       | . . . {among bearers or channels}   | 36/06        | . Reselecting a communication resource in the serving access point   |
| 28/10        | . . Flow control {between communication endpoints}  | 36/08        | . Reselecting an access point  |
| 28/12        | . . . using signaling between network elements  | 36/10        | . Reselecting an access point controller   |
| 28/14        | . . . using intermediate storage  | 36/12        | . Reselecting a serving backbone network switching or routing node   |
| 28/16        | . Central resource management; Negotiation of resources {or communication parameters}, e.g. negotiating bandwidth or QoS [Quality of Service]   | 36/14        | . Reselecting a network or an air interface  |
| 28/18        | . . Negotiating wireless communication parameters   | 36/16        | . Performing reselection for specific purposes   |
| 28/20        | . . . Negotiating bandwidth   | 36/165       | . . {for improving the overall network performance ( <a href="#">H04W 36/18</a> - <a href="#">H04W 36/22</a> take precedence)} |
| 28/22        | . . . Negotiating communication rate  | 36/18        | . . for allowing seamless reselection, e.g. soft reselection   |
| 28/24        | . . Negotiating SLA [Service Level Agreement]; Negotiating QoS [Quality of Service]   | 36/20        | . . for optimizing the interference level  |
| 28/26        | . . Resource reservation  | 36/22        | . . for handling the traffic   |
| <b>36/00</b> | <b>Hand-off or reselection arrangements</b>   | 36/24        | . Reselection being triggered by specific parameters {used to improve the performance of a single terminal}                    |
|              | <b>NOTE</b>   | 36/245       | . . {by historical data}   |
|              | In this group, local priority rules supersede the first-place priority rule (FPPR) applying throughout <a href="#">H04W</a>   | 36/26        | . . by agreed or negotiated communication parameters   |
| 36/0005      | . {Control or signalling for completing the hand-off}   | 36/28        | . . . involving a plurality of connections, e.g. multi-call, multi-bearer connections  |
| 36/0011      | . . {for data session or connection}  | 36/30        | . . by measured or perceived connection quality data   |
| 36/0016      | . . . {for hand-off preparation}  | 36/32        | . . by location or mobility data, e.g. speed data  |
| 36/0022      | . . . {for transferring sessions between adjacent core network technologies}  | 36/34        | . Reselection control  |
| 36/0027      | . . . {for a plurality of sessions or connections, e.g. multi-call, multi-bearer connections}   | 36/36        | . . by user or terminal equipment  |
| 36/0033      | . . . {with transfer of context information}  | 36/365       | . . . {by manual user interaction}   |
| 36/0038      | . . . . {of security context information}   | 36/38        | . . by fixed network equipment   |
| 36/0044      | . . . . {of quality context information}  | 36/385       | . . . {of the core network}  |
| 36/005       | . . {involving radio access media independent information, e.g. MIH [Media independent Hand-off]}   | <b>40/00</b> | <b>Communication routing or communication path finding</b>   |
| 36/0055      | . . {Transmission and use of information for re-establishing the radio link}  | 40/005       | . {Routing actions in the presence of nodes in sleep or doze mode}   |
| 36/0061      | . . . {of neighbor cell information}  | 40/02        | . Communication route or path selection, e.g. power-based or shortest path routing   |
| 36/0066      | . . . {of control information between different types of networks in order to establish a new radio link in the target network}   | 40/023       | . . {Limited or focused flooding to selected areas of a network}   |
|              |   | 40/026       | . . {Route selection considering the moving speed of individual devices}   |
|              |   | 40/04        | . . based on wireless node resources   |
|              |   | 40/06        | . . . based on characteristics of available antennas   |
|              |   | 40/08        | . . . based on transmission power  |
|              |   | 40/10        | . . . based on available power or energy   |
|              |   | 40/12        | . . based on transmission quality or channel quality   |
|              |   | 40/125       | . . . {using a measured number of retransmissions as a link metric}  |
|              |   | 40/14        | . . . based on stability   |



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| 40/16        | . . . based on interference  | 52/0225 | . . . {using monitoring of external events, e.g. the presence of a signal}  |
| 40/18        | . . based on predicted events  | 52/0229 | . . . . {where the received signal is a wanted signal}  |
| 40/20        | . . based on geographic position or location   | 52/0232 | . . . . . {according to average transmission signal activity}   |
| 40/205       | . . . {using topographical information, e.g. hills, high rise buildings}   | 52/0235 | . . . . . {where the received signal is a power saving command}   |
| 40/22        | . . using selective relaying for reaching a BTS [Base Transceiver Station] or an access point  | 52/0238 | . . . . . {where the received signal is an unwanted signal, e.g. interference or idle signal}   |
| 40/24        | . Connectivity information management, e.g. connectivity discovery or connectivity update  | 52/0241 | . . . . . {where no transmission is received, e.g. out of range of the transmitter}   |
| 40/242       | . . {aging of topology database entries}   | 52/0245 | . . . . . {according to signal strength}  |
| 40/244       | . . {using a network of reference devices, e.g. beaconing}   | 52/0248 | . . . . . {dependent on the time of the day, e.g. according to expected transmission activity}  |
| 40/246       | . . {Connectivity information discovery}   | 52/0251 | . . . . {using monitoring of local events, e.g. events related to user activity}  |
| 40/248       | . . {Connectivity information update}  | 52/0254 | . . . . . {detecting a user operation or a tactile contact or a motion of the device}   |
| 40/26        | . . for hybrid routing by combining proactive and reactive routing   | 52/0258 | . . . . . {controlling an operation mode according to history or models of usage information, e.g. activity schedule or time of day}              |
| 40/28        | . . for reactive routing   | 52/0261 | . . . . {managing power supply demand, e.g. depending on battery level}   |
| 40/30        | . . for proactive routing  | 52/0264 | . . . . . {by selectively disabling software applications}  |
| 40/32        | . . for defining a routing cluster membership  | 52/0267 | . . . . . {by controlling user interface components}  |
| 40/34        | . Modification of an existing route  | 52/027  | . . . . . {by controlling a display operation or backlight unit}  |
| 40/36        | . . due to handover  | 52/0274 | . . . . . {by switching on or off the equipment or parts thereof}   |
| 40/38        | . . adapting due to varying relative distances between nodes   | 52/0277 | . . . . . {according to available power supply, e.g. switching off when a low battery condition is detected}                                      |
| <b>48/00</b> | <b>Access restriction; Network selection; Access point selection</b>   | 52/028  | . . . . . {switching on or off only a part of the equipment circuit blocks}   |
| 48/02        | . Access restriction performed under specific conditions   | 52/0283 | . . . . . {with sequential power up or power down of successive circuit blocks, e.g. switching on the local oscillator before RF or mixer stages} |
| 48/04        | . . based on user or terminal location or mobility data, e.g. moving direction, speed  | 52/0287 | . . . . . {changing the clock frequency of a controller in the equipment}   |
| 48/06        | . . based on traffic conditions  | 52/029  | . . . . . {reducing the clock frequency of the controller}  |
| 48/08        | . Access restriction or access information delivery, e.g. discovery data delivery  | 52/0293 | . . . . . {having a sub-controller with a low clock frequency switching on and off a main controller with a high clock frequency}                 |
| 48/10        | . . using broadcasted information  | 52/0296 | . . . . . {switching to a backup power supply}  |
| 48/12        | . . using downlink control channel   | 52/04   | . TPC [Transmission power control]  |
| 48/14        | . . using user query {or user detection}   | 52/06   | . . TPC algorithms  |
| 48/16        | . Discovering, processing access restriction or access information   | 52/08   | . . . Closed loop power control   |
| 48/17        | . {Selecting a data network PoA [Point of Attachment]}   | 52/10   | . . . Open loop power control   |
| 48/18        | . Selecting a network or a communication service   | 52/12   | . . . Outer and inner loops   |
| 48/20        | . Selecting an access point  | 52/125  | . . . . . {cascaded outer loop power control}   |
| <b>52/00</b> | <b>Power Management, e.g. TPC [Transmission Power Control], power saving or power classes {(gain control in transmitters or power amplifiers H03G 3/3042)}</b> | 52/14   | . . . Separate analysis of uplink or downlink   |
| 52/02        | . Power saving arrangements {(in wired systems H04L 12/12; signaling of mobile application services, e.g. low battery notifications H04W 4/20)}                | 52/143  | . . . . . {Downlink power control}  |
| 52/0203      | . . {in the radio access network or backbone network of wireless communication networks}   | 52/146  | . . . . . {Uplink power control}  |
| 52/0206      | . . . {in access points, e.g. base stations (access point devices per se H04W 88/08)}  | 52/16   | . . . Deriving transmission power values from another channel   |
| 52/0209      | . . {in terminal devices (terminal devices per se H04W 88/02)}   | 52/18   | . . TPC being performed according to specific parameters  |
| 52/0212      | . . . {managed by the network, e.g. network or access point is master and terminal is slave}   | 52/20   | . . . using error rate  |
| 52/0216      | . . . . {using a pre-established activity schedule, e.g. traffic indication frame}   | 52/22   | . . . taking into account previous information or commands  |
| 52/0219      | . . . . {where the power saving management affects multiple terminals}   |         |   |
| 52/0222      | . . . . {in packet switched networks}  |         |   |

|        |   |              |   |
|--------|---|--------------|---|
| 52/221 | . . . . {using past power control commands}   | 52/36        | . . . with a discrete range or set of values, e.g. step size, ramping or offsets                          |
| 52/223 | . . . . {predicting future states of the transmission}  | 52/362       | . . . . {Aspects of the step size}  |
| 52/225 | . . . . {Calculation of statistics, e.g. average, variance}   | 52/365       | . . . . {Power headroom reporting}  |
| 52/226 | . . . . {using past references to control power, e.g. look-up-table}  | 52/367       | . . . . {Power values between minimum and maximum limits, e.g. dynamic range}                             |
| 52/228 | . . . . {using past power values or information}  | 52/38        | . . TPC being performed in particular situations  |
| 52/24  | . . . using SIR [Signal to Interference Ratio] or other wireless path parameters  | 52/383       | . . . {power control in peer-to-peer links}   |
| 52/241 | . . . . {taking into account channel quality metrics, e.g. SIR, SNR, CIR, Eb/lo}  | 52/386       | . . . {centralized, e.g. when the radio network controller or equivalent takes part in the power control} |
| 52/242 | . . . . {taking into account path loss}   | 52/40        | . . . during macro-diversity or soft handoff  |
| 52/243 | . . . . {taking into account interferences}   | 52/42        | . . . in systems with time, space, frequency or polarisation diversity                                    |
| 52/244 | . . . . . {Interferences in heterogeneous networks, e.g. among macro and femto or pico cells or other sector / system interference [OSI]} | 52/44        | . . . in connection with interruption of transmission   |
| 52/245 | . . . . {taking into account received signal strength}  | 52/46        | . . . in multi hop networks, e.g. wireless relay networks   |
| 52/246 | . . . . {where the output power of a terminal is based on a path parameter calculated in said terminal}                                   | 52/48        | . . . during retransmission after error or non-acknowledgment   |
| 52/247 | . . . . {where the output power of a terminal is based on a path parameter sent by another terminal}                                      | 52/50        | . . . at the moment of starting communication in a multiple access environment                            |
| 52/248 | . . . . {where transmission power control commands are generated based on a path parameter}   | 52/52        | . . using AGC [Automatic Gain Control] circuits or amplifiers   |
| 52/26  | . . . using transmission rate or quality of service QoS [Quality of Service]  | 52/54        | . . Signalisation aspects of the TPC commands, e.g. frame structure                                       |
| 52/262 | . . . . {taking into account adaptive modulation and coding [AMC] scheme ( <a href="#">AMC per se H04L 1/0001</a> )}                      | 52/545       | . . . {modifying TPC bits in special situations}  |
| 52/265 | . . . . {taking into account the quality of service QoS}  | 52/56        | . . . detection of errors of TPC bits   |
| 52/267 | . . . . {taking into account the information rate}  | 52/58        | . . . format of the TPC bits  |
| 52/28  | . . . using user profile, e.g. mobile speed, priority or network state, e.g. standby, idle or non transmission                            | 52/60        | . . . using different transmission rates for TPC commands   |
| 52/281 | . . . . {taking into account user or data type priority}  | <b>56/00</b> | <b>Synchronization arrangements</b>   |
| 52/282 | . . . . {taking into account the speed of the mobile}   | 56/0005      | . {synchronizing of arrival of multiple uplinks}  |
| 52/283 | . . . . {Power depending on the position of the mobile}   | 56/001       | . {Synchronization between nodes}   |
| 52/285 | . . . . {taking into account the mobility of the user}  | 56/0015      | . . {one node acting as a reference for the others}   |
| 52/286 | . . . . {during data packet transmission, e.g. high speed packet access [HSPA]}   | 56/002       | . . {Mutual synchronization}  |
| 52/287 | . . . . {when the channel is in stand-by}   | 56/0025      | . . {synchronizing potentially movable access points}   |
| 52/288 | . . . . {taking into account the usage mode, e.g. hands-free, data transmission, telephone}   | 56/003       | . {Arrangements to increase tolerance to errors in transmission or reception timing}                      |
| 52/30  | . . using constraints in the total amount of available transmission power   | 56/0035      | . {detecting errors in frequency or phase}  |
| 52/32  | . . . TPC of broadcast or control channels  | 56/004       | . {compensating for timing error of reception due to propagation delay}                                   |
| 52/322 | . . . . {Power control of broadcast channels}   | 56/0045      | . . {compensating for timing error by altering transmission time}   |
| 52/325 | . . . . {Power control of control or pilot channels}  | 56/005       | . . {compensating for timing error by adjustment in the receiver}   |
| 52/327 | . . . . {Power control of multicast channels}   | 56/0055      | . {determining timing error of reception due to propagation delay}  |
| 52/34  | . . . TPC management, i.e. sharing limited amount of power among users or channels or data types, e.g. cell loading                       | 56/006       | . . {using known positions of transmitter and receiver}   |
| 52/343 | . . . . {taking into account loading or congestion level}   | 56/0065      | . . {using measurement of signal travel time}   |
| 52/346 | . . . . {distributing total power among users or channels}  | 56/007       | . . . {Open loop measurement}   |
|        |   | 56/0075      | . . . . {based on arrival time vs. expected arrival time}   |
|        |   | 56/008       | . . . . . {detecting arrival of signal based on received raw signal}                                      |
|        |   | 56/0085      | . . . . . {detecting a given structure in the signal}   |
|        |   | 56/009       | . . . {Closed loop measurements}  |
|        |   | 56/0095      | . . {estimated based on signal strength}  |
|        |   | <b>60/00</b> | <b>Registration, e.g. affiliation to network; De-registration, e.g. terminating affiliation</b>           |
|        |   | 60/005       | . {Multiple registrations, e.g. multihoming}  |

|              |   |              |  |
|--------------|---|--------------|--|
| 60/02        | • by periodical registration  | 72/08        | • • {where an allocation plan is defined} based on quality criteria  |
| 60/04        | • using triggered events  | 72/082       | • • • {using the level of interference}  |
| 60/06        | • De-registration or Detaching  | 72/085       | • • • {using measured or perceived quality}  |
| <b>64/00</b> | <b>Locating users or terminals {or network equipment} for network management purposes, e.g. mobility management</b>         | 72/087       | • • • {using requested quality}  |
| 64/003       | • {locating network equipment}  | 72/10        | • • {where an allocation plan is defined} based on priority criteria   |
| 64/006       | • {with additional information processing, e.g. for direction or speed determination}                                       | 72/12        | • {Dynamic} Wireless traffic scheduling; {Dynamically scheduled allocation on shared channel}  |
| <b>68/00</b> | <b>Notification of users, e.g. alerting for incoming communication or change of service</b>                                 | 72/1205      | • • {Schedule definition, set-up or creation}  |
| 68/005       | • {Transmission of information for alerting of incoming communication}  | 72/121       | • • • {for groups of terminals or users}   |
| 68/02        | • Arrangements for increasing efficiency of notification or paging channel  | 72/1215      | • • • {for collaboration of different radio technologies}  |
| 68/025       | • • {Indirect paging}   | 72/1221      | • • • {based on age of data to be sent}  |
| 68/04        | • multi-step notification using statistical or historical mobility data   | 72/1226      | • • • {based on channel quality criteria, e.g. channel state dependent scheduling}   |
| 68/06        | • using multi-step notification by changing the notification area   | 72/1231      | • • • • {using measured or perceived quality}  |
| 68/08        | • using multi-step notification by increasing the notification area   | 72/1236      | • • • • {using requested quality}  |
| 68/10        | • using simulcast notification  | 72/1242      | • • • {based on precedence or priority of the traffic information}   |
| 68/12        | • Inter-network notification  | 72/1247      | • • • {based on priority of the information source or recipient}   |
| <b>72/00</b> | <b>Local resource management, e.g. wireless traffic scheduling or selection or allocation of wireless resources</b>         | 72/1252      | • • • {based on load}  |
|              | <b>NOTE</b>   | 72/1257      | • • • {based on resource usage policy}   |
|              | In this group, local priority rules supersede the first-place priority rule (FPPR) applying throughout <a href="#">H04W</a> | 72/1263      | • • {Schedule usage, i.e. actual mapping of traffic onto schedule; Multiplexing of flows into one or several streams; Mapping aspects; Scheduled allocation} |
| 72/005       | • {Resource management for broadcast services}  | 72/1268      | • • • {of uplink data flows}   |
| 72/02        | • Selection of wireless resources by user or terminal   | 72/1273      | • • • {of downlink data flows}   |
| 72/04        | • Wireless resource allocation  | 72/1278      | • • {Transmission of control information for scheduling}   |
| 72/0406      | • • {involving control information exchange between nodes}  | 72/1284      | • • • {in the uplink, i.e. from terminal to network}   |
| 72/0413      | • • • {in uplink direction of a wireless link, i.e. towards network}  | 72/1289      | • • • {in the downlink, i.e. towards the terminal}   |
| 72/042       | • • • {in downlink direction of a wireless link, i.e. towards terminal}   | 72/1294      | • • • • {using a grant or specific channel <a href="#">(H04W 72/14 takes precedence)</a> }   |
| 72/0426      | • • • {between access points}   | 72/14        | • • using a grant {or specific} channel  |
| 72/0433      | • • • {between access point and access point controlling device}  | <b>74/00</b> | <b>Wireless channel access, e.g. scheduled or random access</b>  |
| 72/044       | • • {where an allocation plan is defined based on the type of the allocated resource}                                       | 74/002       | • {Transmission of channel access control information}   |
| 72/0446      | • • • {the resource being a slot, sub-slot or frame}  | 74/004       | • • {in the uplink, i.e. towards network}  |
| 72/0453      | • • • {the resource being a frequency, carrier or frequency band}   | 74/006       | • • {in the downlink, i.e. towards the terminal}   |
| 72/046       | • • • {the resource being in the space domain, e.g. beams}  | 74/008       | • • {with additional processing of random access related information at receiving side}  |
| 72/0466      | • • • {the resource being a scrambling code}  | 74/02        | • Hybrid access techniques   |
| 72/0473      | • • • {the resource being transmission power}   | 74/04        | • Scheduled {or contention-free} access  |
| 72/048       | • • {where an allocation plan is defined based on terminal or device properties}  | 74/06        | • • using polling  |
| 72/0486      | • • {where an allocation plan is defined based on load}   | 74/08        | • Non-scheduled {or contention based} access, e.g. random access, ALOHA, CSMA [Carrier Sense Multiple Access]  |
| 72/0493      | • • {where an allocation plan is defined based on a resource usage policy}  | 74/0808      | • • • {using carrier sensing, e.g. as in CSMA}   |
| 72/06        | • • {where an allocation plan is defined} based on a ranking criteria of the wireless resources                             | 74/0816      | • • • • {carrier sensing with collision avoidance}   |
|              |   | 74/0825      | • • • • {carrier sensing with collision detection}   |
|              |   | 74/0833      | • • • {using a random access procedure}  |
|              |   | 74/0841      | • • • • {with collision treatment}   |
|              |   | 74/085       | • • • • • {collision avoidance}  |
|              |   | 74/0858      | • • • • • {collision detection}  |
|              |   | 74/0866      | • • • {using a dedicated channel for access}   |
|              |   | 74/0875      | • • • • {with assigned priorities based access}  |
|              |   | 74/0883      | • • • • {for un-synchronized access}   |

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| 74/0891      | . . . {for synchronized access}  | 80/10        | . . adapted for {application} session management, e.g. SIP [Session Initiation Protocol] {(connection management H04W 76/00; arrangements for session management H04L 67/14)} |
| <b>76/00</b> | <b>Connection management, e.g. connection set-up, manipulation or release</b>  | 80/12        | . . Application layer protocols, e.g. WAP   |
| 76/002       | . {for selective distribution or broadcast}  | <b>84/00</b> | <b>Network topologies</b>   |
| 76/005       | . . {for Push-to-Talk or Push-on-Call services}  | <b>NOTE</b>  |   |
| 76/007       | . {for emergency connection handling}  |              | In this group, local priority rules supersede the first-place priority rule (FPPR) applying throughout H04W   |
| 76/02        | . Connection set-up  |              |   |
| 76/021       | . . {Allocation or use of connection identifiers}  |              |   |
| 76/022       | . . {Set-up of transport tunnels}  |              |   |
| 76/023       | . . {Direct mode set-up}   |              |   |
| 76/025       | . . {Set-up of multiple wireless link connections}   |              |   |
| 76/026       | . . . {involving adjacent core network technologies}   | 84/005       | . {Moving wireless networks}  |
| 76/027       | . . {Management of set-up rejection or failure}  | 84/02        | . Hierarchical pre-organized networks, e.g. paging networks, cellular networks, WLAN [Wireless Local Area Network] or WLL [Wireless Local Loop]                               |
| 76/028       | . . {Connection re-establishment}  |              |   |
| 76/04        | . Connection manipulation  | 84/022       | . . {One-way selective calling networks, e.g. wide area paging}   |
| 76/041       | . . {Manipulation of transport tunnels}  | 84/025       | . . . {with acknowledge back capability}  |
| 76/043       | . . {Direct mode connection manipulation}  | 84/027       | . . . {providing paging services}   |
| 76/045       | . . {Maintenance of an established connection}   | 84/04        | . . Large scale networks; Deep hierarchical networks  |
| 76/046       | . . {Transitions among RRC [Radio Resource Control] states}  | 84/042       | . . . {Public Land Mobile systems, e.g. cellular systems}   |
| 76/048       | . . {Discontinuous transmission or reception [DTX, DRX]}   | 84/045       | . . . . {using private Base Stations, e.g. femto Base Stations, home Node B}  |
| 76/06        | . Connection release   | 84/047       | . . . . {using dedicated repeater stations}   |
| 76/062       | . . {Release of transport tunnels}   | 84/06        | . . . Airborne or Satellite Networks  |
| 76/064       | . . {Selective release of ongoing connections}   | 84/08        | . . . Trunked mobile radio systems  |
| 76/066       | . . . {for the purpose of reassigning the resources associated with the released connections}  | 84/10        | . . Small scale networks; Flat hierarchical networks  |
| 76/068       | . . {Connection release triggered by timers}   | 84/105       | . . . {PBS [Private Base Station] network (H04W 84/12 - H04W 84/16 take precedence)}  |
| <b>80/00</b> | <b>Wireless network protocols or protocol adaptations to wireless operation, e.g. WAP [Wireless Application Protocol]</b>  | 84/12        | . . . WLAN [Wireless Local Area Networks]   |
| 80/02        | . Data link layer protocols  | 84/14        | . . . WLL [Wireless Local Loop]; RLL [Radio Local Loop]   |
|              | <b>WARNING</b>   | 84/16        | . . . WPBX [Wireless Private Branch Exchange]   |
|              | This group is used only for indicating additional information when it is of interest for search  | 84/18        | . Self-organizing networks, e.g. ad-hoc networks or sensor networks   |
| 80/04        | . Network layer protocols, e.g. mobile IP [Internet Protocol]  | 84/20        | . . Master-slave {selection or change} arrangements   |
|              | <b>WARNING</b>   | 84/22        | . . with access to wired networks   |
|              | This group is used only for indicating additional information when it is of interest for search  | <b>88/00</b> | <b>Devices specially adapted for wireless communication networks, e.g. terminals, base stations or access point devices</b>   |
| 80/045       | . . {involving different protocol versions, e.g. MIPv4 and MIPv6}  | 88/005       | . {Data network PoA devices}  |
|              | <b>WARNING</b>   | 88/02        | . Terminal devices  |
|              | This group is used only for indicating additional information when it is of interest for search  | 88/021       | . . {adapted for Wireless Local Loop operation}   |
| 80/06        | . Transport layer protocols, e.g. TCP [Transport Control Protocol] over wireless {(transmission control protocol/Internet protocol [TCP/IP] or user datagram protocol [UDP] H04L 69/16)} | 88/022       | . . {Selective call receivers}  |
| 80/08        | . Upper layer protocols {(network arrangements or communication protocols for networked applications H04L 67/00)}  | 88/023       | . . . {with message or information receiving capability}  |
| 80/085       | . . {involving different upper layer protocol versions, e.g. LCS - SUPL or WSN-SOA-WSDP}   | 88/025       | . . . {Selective call decoders}   |
|              |  | 88/026       | . . . . {using digital address codes}   |
|              |  | 88/027       | . . . . {using frequency address codes}   |
|              |  | 88/028       | . . . . {using pulse address codes}   |
|              |  | 88/04        | . . adapted for relaying to or from another terminal or user  |
|              |  | 88/06        | . . adapted for operation in multiple networks {or having at least two operational modes}, e.g. multi-mode terminals  |
|              |  | 88/08        | . Access point devices  |
|              |  | 88/085       | . . {Access point devices with remote components}   |
|              |  | 88/10        | . . adapted for operation in multiple networks, e.g. multi-mode access points   |
|              |  | 88/12        | . Access point controller devices   |



- 88/14 . Backbone network devices
- 88/16 . Gateway arrangements
- 88/18 . Service Support; Network management devices
- 88/181 . . {Transcoding devices; Rate adaptation devices}
- 88/182 . . {Network node acting on behalf of an other network entity, e.g. proxy}
- 88/184 . . {Messaging devices, e.g. message centre}
- 88/185 . . {Selective call encoders for paging networks, e.g. paging centre devices}
- 88/187 . . . {using digital or pulse address codes}
- 88/188 . . . {using frequency address codes}
- 92/00 Interfaces specially adapted for wireless communication networks**
- 92/02 . Inter-networking arrangements
- 92/04 . Interfaces between hierarchically different network devices
- 92/045 . . {between access point and backbone network device}
- 92/06 . . between gateways and public network devices
- 92/08 . . between user and terminal device
- 92/10 . . between terminal device and access point, i.e. wireless air interface
- 92/12 . . between access points and access point controllers
- 92/14 . . between access point controllers and backbone network device
- 92/16 . Interfaces between hierarchically similar devices
- 92/18 . . between terminal devices
- 92/20 . . between access points
- 92/22 . . between access point controllers
- 92/24 . . between backbone network devices
- 99/00 Subject matter not provided for in other groups of this subclass**