

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.

4/00 **{Mobile application} services or facilities specially adapted for wireless communication networks** {(network arrangements or communication protocols for networked applications [H04L 67/00](#); network arrangements or protocols for real-time communications [H04L 65/00](#); network arrangements or network protocols for addressing or naming [H04L 61/00](#); application independent communication protocol aspects and techniques in packet data networks [H04L 69/00](#); network architectures or network communication protocols for network security [H04L 63/00](#); wireless network security [H04W 12/00](#); message switching systems [H04L 12/58](#); arrangements for broadcast or conference [H04L 12/18](#); 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 [H04M 1/72522](#); automatic or semi-automatic exchanges for telephonic communication - systems providing special services or facilities to subscribers [H04M 3/42](#)}}

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

- 4/001 . {Provisioning or reconfiguring application services, e.g. OMA DM (network management [H04L 12/24](#); network arrangements or communication protocols for networked applications involving the movement of software or configuration parameters, e.g. applets [H04L 67/34](#); program loading or initiating [G06F 9/445](#); mobile agents [G06F 9/4862](#))}
- 4/003 . {Mobile application execution environments for application services, e.g. communicating with application store or appstore servers in the application service network and vice versa, 3GPP SIM Application toolkit [SAT], 3GPP OSA or 3GPP MEXE (processing of user or subscriber data at user equipment or user record carrier [H04W 8/183](#))}
- 4/005 . {for Machine-to-Machine communication [M2M, MTC], e.g. 3GPP M2M, OMA M2M, 3GPP MTC or Wireless Sensor Networks [WSN] (self-organizing networks [H04W 84/18](#); 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 [H04L 67/12](#); mechanical means for transferring the output of a sensing member [G01D 5/00](#))}
- 4/006 . . {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}

- 4/008 . {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 [H04M 1/7253](#); mechanical means for transferring the output of a sensing member [G01D 5/00](#); near-field transmission systems [H04B 5/00](#))}
- 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 12/58](#); 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 {(network arrangements or communication protocols for networked applications involving intermediate processing or storage in the network, e.g. proxy, [H04L 67/28](#); message adaptation based on network or terminal capabilities for message switching systems [H04L 12/5825](#))}
- 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]

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| 8/06 | . . Registration at serving network Location Register, VLR or user mobility server | 16/20 | . . for indoor coverage or short range network deployment |
| 8/065 | . . . {involving selection of the user mobility server} | 16/22 | . Traffic simulation tools or models |
| 8/08 | . . Mobility data transfer | 16/225 | . . {for indoor or short range network} |
| 8/082 | . . . {for traffic bypassing of mobility servers, e.g. location registers, home PLMNs or home agents} | 16/24 | . Cell structures |
| 8/085 | . . . {involving hierarchical organized mobility servers, e.g. hierarchical mobile IP [HMIP]} | 16/26 | . . Cell enhancers {or enhancement}, e.g. for tunnels, building shadow |
| 8/087 | . . . {for preserving data network PoA address despite hand-offs} | 16/28 | . . using beam steering |
| 8/10 | . . . between location register and external networks | 16/30 | . . Special cell shapes, e.g. doughnuts or ring cells |
| 8/12 | . . . between location registers or mobility servers | 16/32 | . . Hierarchical cell structures |
| 8/14 | . . . between corresponding nodes | 24/00 | Supervisory, monitoring or testing arrangements |
| 8/16 | . . . selectively restricting mobility {data} tracking | 24/02 | . Arrangements for optimizing operational condition |
| 8/18 | . Processing of user or subscriber data, e.g. subscribed services, user preferences or user profiles; Transfer of user or subscriber data | 24/04 | . Arrangements for maintaining operational condition |
| 8/183 | . . {Processing at user equipment or user record carrier} | 24/06 | . Testing, {supervising or monitoring} using simulated traffic |
| 8/186 | . . {Processing of subscriber group data} | 24/08 | . Testing, {supervising or monitoring} using real traffic |
| 8/20 | . . Transfer of user or subscriber data | 24/10 | . Scheduling measurement reports; {Arrangements for measurement reports} |
| 8/205 | . . . {Transfer to or from user equipment or user record carrier} | 28/00 | Network traffic or resource management |
| 8/22 | . Processing or transfer of terminal data, e.g. status or physical capabilities | 28/02 | . Traffic management, e.g. flow control or congestion control |
| 8/24 | . . Transfer of terminal data | 28/0205 | . . {at the air interface (dynamic wireless traffic scheduling H04W 72/12)} |
| 8/245 | . . . {from a network towards a terminal} | 28/021 | . . {in wireless networks with changing topologies, e.g. ad-hoc networks (self-organizing networks H04W 84/18)} |
| 8/26 | . Network addressing or numbering for mobility support | 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 H04W 4/005 ; wireless resource selection or allocation plan definition based on terminal or device properties H04W 72/048)} |
| 8/265 | . . {for initial activation of new user} | 28/0221 | . . . {power availability or consumption} |
| 8/28 | . . Number portability; {Network address portability} | 28/0226 | . . {based on location or mobility (handoff or reselection H04W 36/00 ; mobile application services making use of the location of users or terminals H04W 4/02)} |
| 8/30 | . Network data restoration; {Network data reliability; Network data fault tolerance} | 28/0231 | . . {based on communication conditions (dynamic wireless traffic scheduling definition based on channel quality criteria H04W 72/1226)} |
| 12/00 | Security arrangements, e.g. access security or fraud detection; Authentication, e.g. verifying user identity or authorisation; Protecting privacy or anonymity | 28/0236 | . . . {radio quality, e.g. interference, losses or delay} |
| 12/02 | . Protecting privacy or anonymity | 28/0242 | . . . {Determining whether packet losses are due to overload or to deterioration of radio communication conditions} |
| 12/04 | . Key management | 28/0247 | . . {based on conditions of the access network or the infrastructure network (central resource management H04W 28/16)} |
| 12/06 | . Authentication | 28/0252 | . . {per individual bearer or channel (dynamic wireless traffic scheduling H04W 72/12)} |
| 12/08 | . Access security | 28/0257 | . . . {the individual bearer or channel having a maximum bit rate or a bit rate guarantee} |
| 12/10 | . Integrity | 28/0263 | . . . {involving mapping traffic to individual bearers or channels, e.g. traffic flow template [TFT]} |
| 12/12 | . Fraud detection | 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 H04W 28/24)} |
| 16/00 | Network planning, e.g. coverage or traffic planning tools; Network deployment, e.g. resource partitioning or cells structures | | |
| 16/02 | . Resource partitioning among network components, e.g. reuse partitioning | | |
| 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 | | |

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| 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 H04W 80/00)} | 36/0022 | . . . {for transferring sessions between adjacent core network technologies} |
| 28/0278 | . . {using buffer status reports (dynamic wireless traffic scheduling definition H04W 72/1205)} | 36/0027 | . . . {for a plurality of sessions or connections, e.g. multi-call, multi-bearer connections} |
| 28/0284 | . . {detecting congestion or overload during communication (monitoring arrangements H04L 12/2602)} | 36/0033 | . . . {with transfer of context information} |
| 28/0289 | . . {Congestion control (performing reselection for handling the traffic H04W 36/22 ; load shedding arrangements in network planning H04W 16/08 ; dynamic wireless traffic scheduling H04W 72/12)} | 36/0038 | {of security context information} |
| 28/0294 | . . {forcing collision (non-scheduled or contention based wireless access channel H04W 74/08)} | 36/0044 | {of quality context information} |
| 28/04 | . . Error control {, e.g. treating errors, collisions, noise or interference (arrangements for detecting or preventing errors in the information received H04L 1/00)} | 36/005 | . . {involving radio access media independent information, e.g. MIH [Media independent Hand-off]} |
| 28/042 | . . . {Treating collisions} | 36/0055 | . . {Transmission and use of information for re-establishing the radio link} |
| 28/044 | {Collision avoidance} | 36/0061 | . . . {of neighbor cell information} |
| 28/046 | {Collision detection} | 36/0066 | . . . {of control information between different types of networks in order to establish a new radio link in the target network} |
| 28/048 | . . . {Treating noise or interference (means associated with receiver for limiting or suppressing noise or interference induced by transmission H04B 1/10 ; baseband systems or shaping networks in transmitter or receiver H04L 25/03)} | 36/0072 | . . . {of resource information of target access point} |
| 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 H04L 1/0007 ; dynamic adaptation of the packet size for flow control or congestion control H04L 47/365)} | 36/0077 | . . . {of access information of target access point} |
| 28/065 | . . . {using assembly or disassembly of packets} | 36/0083 | . . {Determination of parameters used for hand-off, e.g. generation or modification of neighbour cell lists} |
| 28/08 | . . Load balancing or load distribution | 36/0088 | . . . {Scheduling hand-off measurements} |
| 28/085 | . . . {among bearers or channels} | 36/0094 | . . . {Definition of hand-off measurement parameters} |
| 28/10 | . . Flow control {between communication endpoints} | 36/02 | . Buffering or recovering information during reselection; {Modification of the traffic flow during hand-off} |
| 28/12 | . . . using signaling between network elements | 36/023 | . . {Buffering or recovering information during reselection} |
| 28/14 | . . . using intermediate storage | 36/026 | . . {Multicasting of data during hand-off} |
| 28/16 | . Central resource management; Negotiation of resources {or communication parameters}, e.g. negotiating bandwidth or QoS [Quality of Service] | 36/04 | . Reselecting a cell layer in multi-layered cells |
| 28/18 | . . Negotiating wireless communication parameters | 36/06 | . Reselecting a communication resource in the serving access point |
| 28/20 | . . . Negotiating bandwidth | 36/08 | . Reselecting an access point |
| 28/22 | . . . Negotiating communication rate | 36/10 | . Reselecting an access point controller |
| 28/24 | . . Negotiating SLA [Service Level Agreement]; Negotiating QoS [Quality of Service] | 36/12 | . Reselecting a serving backbone network switching or routing node |
| 28/26 | . . Resource reservation | 36/14 | . Reselecting a network or an air interface |
| 36/00 | Hand-off or reselection arrangements | 36/16 | . Performing reselection for specific purposes |
| | NOTE | 36/165 | . . {for improving the overall network performance (H04W 36/18 - H04W 36/22 take precedence)} |
| | In this group, local priority rules supersede the first-place priority rule (FPPR) applying throughout H04W | 36/18 | . . for allowing seamless reselection, e.g. soft reselection |
| 36/0005 | . {Control or signalling for completing the hand-off} | 36/20 | . . for optimizing the interference level |
| 36/0011 | . . {for data session or connection} | 36/22 | . . for handling the traffic |
| 36/0016 | . . . {for hand-off preparation} | 36/24 | . Reselection being triggered by specific parameters {used to improve the performance of a single terminal} |
| | | 36/245 | . . {by historical data} |
| | | 36/26 | . . by agreed or negotiated communication parameters |
| | | 36/28 | . . . involving a plurality of connections, e.g. multi-call, multi-bearer connections |
| | | 36/30 | . . by measured or perceived connection quality data |
| | | 36/32 | . . by location or mobility data, e.g. speed data |
| | | 36/34 | . Reselection control |
| | | 36/36 | . . by user or terminal equipment |
| | | 36/365 | . . . {by manual user interaction} |
| | | 36/38 | . . by fixed network equipment |
| | | 36/385 | . . . {of the core network} |
| | | 40/00 | Communication routing or communication path finding |

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| 40/005 | • {Routing actions in the presence of nodes in sleep or doze mode} | 52/02 | • Power saving arrangements {(in wired systems H04L 12/12 ; signaling of mobile application services, e.g. low battery notifications H04W 4/20)} |
| 40/02 | • Communication route or path selection, e.g. power-based or shortest path routing | 52/0203 | • • {in the radio access network or backbone network of wireless communication networks} |
| 40/023 | • • {Limited or focused flooding to selected areas of a network} | 52/0206 | • • • {in access points, e.g. base stations (access point devices per se H04W 88/08)} |
| 40/026 | • • {Route selection considering the moving speed of individual devices} | 52/0209 | • • {in terminal devices (terminal devices per se H04W 88/02)} |
| 40/04 | • • based on wireless node resources | 52/0212 | • • • {managed by the network, e.g. network or access point is master and terminal is slave} |
| 40/06 | • • • based on characteristics of available antennas | 52/0216 | • • • • {using a pre-established activity schedule, e.g. traffic indication frame} |
| 40/08 | • • • based on transmission power | 52/0219 | • • • • {where the power saving management affects multiple terminals} |
| 40/10 | • • • based on available power or energy | 52/0222 | • • • • {in packet switched networks} |
| 40/12 | • • based on transmission quality or channel quality | 52/0225 | • • • {using monitoring of external events, e.g. the presence of a signal} |
| 40/125 | • • • {using a measured number of retransmissions as a link metric} | 52/0229 | • • • • {where the received signal is a wanted signal} |
| 40/14 | • • • based on stability | 52/0232 | • • • • • {according to average transmission signal activity} |
| 40/16 | • • • based on interference | 52/0235 | • • • • • {where the received signal is a power saving command} |
| 40/18 | • • based on predicted events | 52/0238 | • • • • • {where the received signal is an unwanted signal, e.g. interference or idle signal} |
| 40/20 | • • based on geographic position or location | 52/0241 | • • • • • {where no transmission is received, e.g. out of range of the transmitter} |
| 40/205 | • • • {using topographical information, e.g. hills, high rise buildings} | 52/0245 | • • • • • {according to signal strength} |
| 40/22 | • • using selective relaying for reaching a BTS [Base Transceiver Station] or an access point | 52/0248 | • • • • • {dependent on the time of the day, e.g. according to expected transmission activity} |
| 40/24 | • Connectivity information management, e.g. connectivity discovery or connectivity update | 52/0251 | • • • • {using monitoring of local events, e.g. events related to user activity} |
| 40/242 | • • {aging of topology database entries} | 52/0254 | • • • • • {detecting a user operation or a tactile contact or a motion of the device} |
| 40/244 | • • {using a network of reference devices, e.g. beaconing} | 52/0258 | • • • • • {controlling an operation mode according to history or models of usage information, e.g. activity schedule or time of day} |
| 40/246 | • • {Connectivity information discovery} | 52/0261 | • • • • {managing power supply demand, e.g. depending on battery level} |
| 40/248 | • • {Connectivity information update} | 52/0264 | • • • • • {by selectively disabling software applications} |
| 40/26 | • • for hybrid routing by combining proactive and reactive routing | 52/0267 | • • • • • {by controlling user interface components} |
| 40/28 | • • for reactive routing | 52/027 | • • • • • {by controlling a display operation or backlight unit} |
| 40/30 | • • for proactive routing | 52/0274 | • • • • • {by switching on or off the equipment or parts thereof} |
| 40/32 | • • for defining a routing cluster membership | 52/0277 | • • • • • {according to available power supply, e.g. switching off when a low battery condition is detected} |
| 40/34 | • Modification of an existing route | 52/028 | • • • • • {switching on or off only a part of the equipment circuit blocks} |
| 40/36 | • • due to handover | 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} |
| 40/38 | • • adapting due to varying relative distances between nodes | 52/0287 | • • • • • {changing the clock frequency of a controller in the equipment} |
| 48/00 | Access restriction; Network selection; Access point selection | 52/029 | • • • • • {reducing the clock frequency of the controller} |
| 48/02 | • Access restriction performed under specific conditions | 52/0293 | • • • • • {having a sub-controller with a low clock frequency switching on and off a main controller with a high clock frequency} |
| 48/04 | • • based on user or terminal location or mobility data, e.g. moving direction, speed | 52/0296 | • • • • • {switching to a backup power supply} |
| 48/06 | • • based on traffic conditions | | |
| 48/08 | • Access restriction or access information delivery, e.g. discovery data delivery | | |
| 48/10 | • • using broadcasted information | | |
| 48/12 | • • using downlink control channel | | |
| 48/14 | • • using user query {or user detection} | | |
| 48/16 | • Discovering, processing access restriction or access information | | |
| 48/17 | • {Selecting a data network PoA [Point of Attachment]} | | |
| 48/18 | • Selecting a network or a communication service | | |
| 48/20 | • Selecting an access point | | |
| 52/00 | Power Management, e.g. TPC [Transmission Power Control], power saving or power classes {(gain control in transmitters or power amplifiers H03G 3/3042)} | | |

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| 52/04 | . TPC [Transmission power control] | 52/287 | {when the channel is in stand-by} |
| 52/06 | . . TPC algorithms | 52/288 | {taking into account the usage mode, e.g. hands-free, data transmission, telephone} |
| 52/08 | . . . Closed loop power control | 52/30 | . . using constraints in the total amount of available transmission power |
| 52/10 | . . . Open loop power control | 52/32 | . . . TPC of broadcast or control channels |
| 52/12 | . . . Outer and inner loops | 52/322 | {Power control of broadcast channels} |
| 52/125 | {cascaded outer loop power control} | 52/325 | {Power control of control or pilot channels} |
| 52/14 | . . . Separate analysis of uplink or downlink | 52/327 | {Power control of multicast channels} |
| 52/143 | {Downlink power control} | 52/34 | . . . TPC management, i.e. sharing limited amount of power among users or channels or data types, e.g. cell loading |
| 52/146 | {Uplink power control} | 52/343 | {taking into account loading or congestion level} |
| 52/16 | . . . Deriving transmission power values from another channel | 52/346 | {distributing total power among users or channels} |
| 52/18 | . . TPC being performed according to specific parameters | 52/36 | . . . with a discrete range or set of values, e.g. step size, ramping or offsets |
| 52/20 | . . . using error rate | 52/362 | {Aspects of the step size} |
| 52/22 | . . . taking into account previous information or commands | 52/365 | {Power headroom reporting} |
| 52/221 | {using past power control commands} | 52/367 | {Power values between minimum and maximum limits, e.g. dynamic range} |
| 52/223 | {predicting future states of the transmission} | 52/38 | . . TPC being performed in particular situations |
| 52/225 | {Calculation of statistics, e.g. average, variance} | 52/383 | . . . {power control in peer-to-peer links} |
| 52/226 | {using past references to control power, e.g. look-up-table} | 52/386 | . . . {centralized, e.g. when the radio network controller or equivalent takes part in the power control} |
| 52/228 | {using past power values or information} | 52/40 | . . . during macro-diversity or soft handoff |
| 52/24 | . . . using SIR [Signal to Interference Ratio] or other wireless path parameters | 52/42 | . . . in systems with time, space, frequency or polarisation diversity |
| 52/241 | {taking into account channel quality metrics, e.g. SIR, SNR, CIR, Eb/lo} | 52/44 | . . . in connection with interruption of transmission |
| 52/242 | {taking into account path loss} | 52/46 | . . . in multi hop networks, e.g. wireless relay networks |
| 52/243 | {taking into account interferences} | 52/48 | . . . during retransmission after error or non-acknowledgment |
| 52/244 | {Interferences in heterogeneous networks, e.g. among macro and femto or pico cells or other sector / system interference [OSI]} | 52/50 | . . . at the moment of starting communication in a multiple access environment |
| 52/245 | {taking into account received signal strength} | 52/52 | . . using AGC [Automatic Gain Control] circuits or amplifiers |
| 52/246 | {where the output power of a terminal is based on a path parameter calculated in said terminal} | 52/54 | . . Signalisation aspects of the TPC commands, e.g. frame structure |
| 52/247 | {where the output power of a terminal is based on a path parameter sent by another terminal} | 52/545 | . . . {modifying TPC bits in special situations} |
| 52/248 | {where transmission power control commands are generated based on a path parameter} | 52/56 | . . . detection of errors of TPC bits |
| 52/26 | . . . using transmission rate or quality of service QoS [Quality of Service] | 52/58 | . . . format of the TPC bits |
| 52/262 | {taking into account adaptive modulation and coding [AMC] scheme (AMC per se H04L 1/0001)} | 52/60 | . . . using different transmission rates for TPC commands |
| 52/265 | {taking into account the quality of service QoS} | 56/00 | Synchronization arrangements |
| 52/267 | {taking into account the information rate} | 56/0005 | . {synchronizing of arrival of multiple uplinks} |
| 52/28 | . . . using user profile, e.g. mobile speed, priority or network state, e.g. standby, idle or non transmission | 56/001 | . {Synchronization between nodes} |
| 52/281 | {taking into account user or data type priority} | 56/0015 | . . {one node acting as a reference for the others} |
| 52/282 | {taking into account the speed of the mobile} | 56/002 | . . {Mutual synchronization} |
| 52/283 | {Power depending on the position of the mobile} | 56/0025 | . . {synchronizing potentially movable access points} |
| 52/285 | {taking into account the mobility of the user} | 56/003 | . {Arrangements to increase tolerance to errors in transmission or reception timing} |
| 52/286 | {during data packet transmission, e.g. high speed packet access [HSPA]} | 56/0035 | . {detecting errors in frequency or phase} |
| | | 56/004 | . {compensating for timing error of reception due to propagation delay} |
| | | 56/0045 | . . {compensating for timing error by altering transmission time} |
| | | 56/005 | . . {compensating for timing error by adjustment in the receiver} |

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| 56/0055 | . {determining timing error of reception due to propagation delay} | 72/044 | . . {where an allocation plan is defined based on the type of the allocated resource} |
| 56/006 | . . {using known positions of transmitter and receiver} | 72/0446 | . . . {the resource being a slot, sub-slot or frame} |
| 56/0065 | . . {using measurement of signal travel time} | 72/0453 | . . . {the resource being a frequency, carrier or frequency band} |
| 56/007 | . . . {Open loop measurement} | 72/046 | . . . {the resource being in the space domain, e.g. beams} |
| 56/0075 | {based on arrival time vs. expected arrival time} | 72/0466 | . . . {the resource being a scrambling code} |
| 56/008 | {detecting arrival of signal based on received raw signal} | 72/0473 | . . . {the resource being transmission power} |
| 56/0085 | {detecting a given structure in the signal} | 72/048 | . . {where an allocation plan is defined based on terminal or device properties} |
| 56/009 | . . . {Closed loop measurements} | 72/0486 | . . {where an allocation plan is defined based on load} |
| 56/0095 | . . {estimated based on signal strength} | 72/0493 | . . {where an allocation plan is defined based on a resource usage policy} |
| 60/00 | Registration, e.g. affiliation to network; De-registration, e.g. terminating affiliation | 72/06 | . . {where an allocation plan is defined} based on a ranking criteria of the wireless resources |
| 60/005 | . {Multiple registrations, e.g. multihoming} | 72/08 | . . {where an allocation plan is defined} based on quality criteria |
| 60/02 | . by periodical registration | 72/082 | . . . {using the level of interference} |
| 60/04 | . using triggered events | 72/085 | . . . {using measured or perceived quality} |
| 60/06 | . De-registration or Detaching | 72/087 | . . . {using requested quality} |
| 64/00 | Locating users or terminals {or network equipment} for network management purposes, e.g. mobility management | 72/10 | . . {where an allocation plan is defined} based on priority criteria |
| 64/003 | . {locating network equipment} | 72/12 | . {Dynamic} Wireless traffic scheduling; {Dynamically scheduled allocation on shared channel} |
| 64/006 | . {with additional information processing, e.g. for direction or speed determination} | 72/1205 | . . {Schedule definition, set-up or creation} |
| 68/00 | Notification of users, e.g. alerting for incoming communication or change of service | 72/121 | . . . {for groups of terminals or users} |
| 68/005 | . {Transmission of information for alerting of incoming communication} | 72/1215 | . . . {for collaboration of different radio technologies} |
| 68/02 | . Arrangements for increasing efficiency of notification or paging channel | 72/1221 | . . . {based on age of data to be sent} |
| 68/025 | . . {Indirect paging} | 72/1226 | . . . {based on channel quality criteria, e.g. channel state dependent scheduling} |
| 68/04 | . multi-step notification using statistical or historical mobility data | 72/1231 | {using measured or perceived quality} |
| 68/06 | . using multi-step notification by changing the notification area | 72/1236 | {using requested quality} |
| 68/08 | . using multi-step notification by increasing the notification area | 72/1242 | . . . {based on precedence or priority of the traffic information} |
| 68/10 | . using simulcast notification | 72/1247 | . . . {based on priority of the information source or recipient} |
| 68/12 | . Inter-network notification | 72/1252 | . . . {based on load} |
| 72/00 | Local resource management, e.g. wireless traffic scheduling or selection or allocation of wireless resources | 72/1257 | . . . {based on resource usage policy} |
| | NOTE | 72/1263 | . . {Schedule usage, i.e. actual mapping of traffic onto schedule; Multiplexing of flows into one or several streams; Mapping aspects; Scheduled allocation} |
| | In this group, local priority rules supersede the first-place priority rule (FPPR) applying throughout H04W | 72/1268 | . . . {of uplink data flows} |
| 72/005 | . {Resource management for broadcast services} | 72/1273 | . . . {of downlink data flows} |
| 72/02 | . Selection of wireless resources by user or terminal | 72/1278 | . . {Transmission of control information for scheduling} |
| 72/04 | . Wireless resource allocation | 72/1284 | . . . {in the uplink, i.e. from terminal to network} |
| 72/0406 | . . {involving control information exchange between nodes} | 72/1289 | . . . {in the downlink, i.e. towards the terminal} |
| 72/0413 | . . . {in uplink direction of a wireless link, i.e. towards network} | 72/1294 | {using a grant or specific channel (H04W 72/14 takes precedence)} |
| 72/042 | . . . {in downlink direction of a wireless link, i.e. towards terminal} | 72/14 | . . using a grant {or specific} channel |
| 72/0426 | . . . {between access points} | 74/00 | Wireless channel access, e.g. scheduled or random access |
| 72/0433 | . . . {between access point and access point controlling device} | 74/002 | . {Transmission of channel access control information} |
| | | 74/004 | . . {in the uplink, i.e. towards network} |
| | | 74/006 | . . {in the downlink, i.e. towards the terminal} |
| | | 74/008 | . . {with additional processing of random access related information at receiving side} |

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| 74/02 | . Hybrid access techniques | 80/045 | . . {involving different protocol versions, e.g. MIPv4 and MIPv6} |
| 74/04 | . Scheduled {or contention-free} access | | WARNING |
| 74/06 | . . using polling | | This group is used only for indicating additional information when it is of interest for search |
| 74/08 | . Non-scheduled {or contention based} access, e.g. random access, ALOHA, CSMA [Carrier Sense Multiple Access] | | |
| 74/0808 | . . {using carrier sensing, e.g. as in CSMA} | 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)} |
| 74/0816 | . . . {carrier sensing with collision avoidance} | 80/08 | . Upper layer protocols {(network arrangements or communication protocols for networked applications H04L 67/00)} |
| 74/0825 | . . . {carrier sensing with collision detection} | 80/085 | . . {involving different upper layer protocol versions, e.g. LCS - SUPL or WSN-SOA-WSDP} |
| 74/0833 | . . {using a random access procedure} | 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)} |
| 74/0841 | . . . {with collision treatment} | 80/12 | . . Application layer protocols, e.g. WAP |
| 74/085 | {collision avoidance} | | |
| 74/0858 | {collision detection} | 84/00 | Network topologies |
| 74/0866 | . . {using a dedicated channel for access} | | NOTE |
| 74/0875 | . . . {with assigned priorities based access} | | In this group, local priority rules supersede the first-place priority rule (FPPR) applying throughout H04W |
| 74/0883 | . . . {for un-synchronized access} | 84/005 | . {Moving wireless networks} |
| 74/0891 | . . . {for synchronized access} | 84/02 | . Hierarchical pre-organized networks, e.g. paging networks, cellular networks, WLAN [Wireless Local Area Network] or WLL [Wireless Local Loop] |
| 76/00 | Connection management, e.g. connection set-up, manipulation or release | 84/022 | . . {One-way selective calling networks, e.g. wide area paging} |
| 76/002 | . {for selective distribution or broadcast} | 84/025 | . . . {with acknowledge back capability} |
| 76/005 | . . {for Push-to-Talk or Push-on-Call services} | 84/027 | . . . {providing paging services} |
| 76/007 | . {for emergency connection handling} | 84/04 | . . Large scale networks; Deep hierarchical networks |
| 76/02 | . Connection set-up | 84/042 | . . . {Public Land Mobile systems, e.g. cellular systems} |
| 76/021 | . . {Allocation or use of connection identifiers} | 84/045 | {using private Base Stations, e.g. femto Base Stations, home Node B} |
| 76/022 | . . {Set-up of transport tunnels} | 84/047 | {using dedicated repeater stations} |
| 76/023 | . . {Direct mode set-up} | 84/06 | . . . Airborne or Satellite Networks |
| 76/025 | . . {Set-up of multiple wireless link connections} | 84/08 | . . . Trunked mobile radio systems |
| 76/026 | . . . {involving adjacent core network technologies} | 84/10 | . . Small scale networks; Flat hierarchical networks |
| 76/027 | . . {Management of set-up rejection or failure} | 84/105 | . . . {PBS [Private Base Station] network (H04W 84/12 - H04W 84/16 take precedence)} |
| 76/028 | . . {Connection re-establishment} | 84/12 | . . . WLAN [Wireless Local Area Networks] |
| 76/04 | . Connection manipulation | 84/14 | . . . WLL [Wireless Local Loop]; RLL [Radio Local Loop] |
| 76/041 | . . {Manipulation of transport tunnels} | 84/16 | . . . WPBX [Wireless Private Branch Exchange] |
| 76/043 | . . {Direct mode connection manipulation} | 84/18 | . Self-organizing networks, e.g. ad-hoc networks or sensor networks |
| 76/045 | . . {Maintenance of an established connection} | 84/20 | . . Master-slave {selection or change} arrangements |
| 76/046 | . . {Transitions among RRC [Radio Resource Control] states} | 84/22 | . . with access to wired networks |
| 76/048 | . . {Discontinuous transmission or reception [DTX, DRX]} | 88/00 | Devices specially adapted for wireless communication networks, e.g. terminals, base stations or access point devices |
| 76/06 | . Connection release | 88/005 | . {Data network PoA devices} |
| 76/062 | . . {Release of transport tunnels} | 88/02 | . Terminal devices |
| 76/064 | . . {Selective release of ongoing connections} | 88/021 | . . {adapted for Wireless Local Loop operation} |
| 76/066 | . . . {for the purpose of reassigning the resources associated with the released connections} | 88/022 | . . {Selective call receivers} |
| 76/068 | . . {Connection release triggered by timers} | | |
| 80/00 | Wireless network protocols or protocol adaptations to wireless operation, e.g. WAP [Wireless Application Protocol] | | |
| 80/02 | . Data link layer protocols | | |
| | WARNING | | |
| | This group is used only for indicating additional information when it is of interest for search | | |
| 80/04 | . Network layer protocols, e.g. mobile IP [Internet Protocol] | | |
| | WARNING | | |
| | This group is used only for indicating additional information when it is of interest for search | | |

- 88/023 . . . {with message or information receiving capability}
- 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**