

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H04 ELECTRIC COMMUNICATION TECHNIQUE

(NOTE omitted)

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

- 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.
- 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](#).
- In this subclass, the first place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.

4/00 Services specially adapted for wireless communication networks; Facilities therefor

NOTES

- This group covers mobile application services or application service signalling for communication over wireless networks.
- This group focuses on application services specially adapted for wireless networks or adjusted to the wireless environment
- In this group, the first place priority rule is not applied, i.e. the common rule is applied.

4/02 Services making use of location information

WARNING

Group [H04W 4/02](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#), [H04W 4/043](#), and [H04W 4/046](#).

Group [H04W 4/02](#) is also impacted by reclassification into groups [H04W 4/024](#) and [H04W 4/029](#).

All groups listed in this Warning should be considered in order to perform a complete search .

4/021 . . Services related to particular areas, e.g. point of interest [POI] services, venue services or geofences

WARNING

Group [H04W 4/021](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#), [H04W 4/043](#) and [H04W 4/046](#).

Groups [H04W 4/04](#), [H04W 4/043](#), [H04W 4/046](#) and [H04W 4/021](#) should be considered in order to perform a complete search.

4/022 . . . {with dynamic range variability}

WARNING

Group [H04W 4/022](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#), [H04W 4/043](#) and [H04W 4/046](#).

Groups [H04W 4/04](#), [H04W 4/043](#), [H04W 4/046](#) and [H04W 4/022](#) should be considered in order to perform a complete search.

- 4/023 . . {using mutual or relative location information between multiple location based services [LBS] targets or of distance thresholds}
- WARNING**
- Group [H04W 4/023](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#), [H04W 4/043](#) and [H04W 4/046](#). Groups [H04W 4/04](#), [H04W 4/043](#), [H04W 4/046](#) and [H04W 4/023](#) should be considered in order to perform a complete search.
- 4/024 . . Guidance services
- WARNING**
- Group [H04W 4/024](#) is incomplete pending reclassification of documents from groups [H04W 4/02](#), [H04W 4/04](#), [H04W 4/043](#) and [H04W 4/046](#). Groups [H04W 4/02](#), [H04W 4/04](#), [H04W 4/043](#), [H04W 4/046](#) and [H04W 4/024](#) should be considered in order to perform a complete search.
- 4/025 . . {using location based information parameters}
- WARNING**
- Group [H04W 4/025](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#), [H04W 4/043](#) and [H04W 4/046](#). Groups [H04W 4/04](#), [H04W 4/043](#), [H04W 4/046](#) and [H04W 4/025](#) should be considered in order to perform a complete search.
- 4/026 . . . {using orientation information, e.g. compass}
- WARNING**
- Group [H04W 4/026](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#), [H04W 4/043](#) and [H04W 4/046](#). Groups [H04W 4/04](#), [H04W 4/043](#), [H04W 4/046](#) and [H04W 4/026](#) should be considered in order to perform a complete search.
- 4/027 . . . {using movement velocity, acceleration information}
- WARNING**
- Group [H04W 4/027](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#), [H04W 4/043](#) and [H04W 4/046](#). Groups [H04W 4/04](#), [H04W 4/043](#), [H04W 4/046](#) and [H04W 4/027](#) should be considered in order to perform a complete search.
- 4/029 . . Location-based management or tracking services
- WARNING**
- Group [H04W 4/029](#) is incomplete pending reclassification of documents from groups [H04W 4/02](#), [H04W 4/04](#), [H04W 4/043](#) and [H04W 4/046](#). Groups [H04W 4/02](#), [H04W 4/04](#), [H04W 4/043](#), [H04W 4/046](#) and [H04W 4/029](#) should be considered in order to perform a complete search.
- 4/04 (Frozen) . . {using association of physical positions and logical data} in a dedicated environment, e.g. buildings or vehicles
- WARNING**
- Group [H04W 4/04](#) is no longer used for the classification of documents as of February 1, 2018. The content of this group is being reclassified into groups [H04W 4/02](#) – [H04W 4/029](#), and [H04W 4/30](#) – [H04W 4/48](#). All groups listed in this Warning should be considered in order to perform a complete search.
- 4/043 (Frozen) . . . {using ambient awareness, e.g. involving buildings using floor or room numbers}
- WARNING**
- Group [H04W 4/043](#) is no longer used for the classification of documents as of February 1, 2018. The content of this group is being reclassified into groups [H04W 4/02](#) – [H04W 4/029](#), and [H04W 4/33](#). All groups listed in this Warning should be considered in order to perform a complete search.
- 4/046 (Frozen) . . . {involving vehicles, e.g. floating traffic data [FTD] or vehicle traffic prediction}
- WARNING**
- Group [H04W 4/046](#) is no longer used for the classification of documents as of February 1, 2018. The content of this group is being reclassified into groups [H04W 4/02](#) – [H04W 4/029](#), and [H04W 4/40](#) – [H04W 4/48](#). All groups listed in this Warning should be considered in order to perform a complete search.
- 4/06 . Selective distribution of broadcast services, e.g. multimedia broadcast multicast service [MBMS]; Services to user groups; One-way selective calling services
- 4/08 . . User group management
- 4/10 . . Push-to-Talk [PTT] or Push-On-Call services
- 4/12 . Messaging; Mailboxes; Announcements
- 4/14 . . Short messaging services, e.g. short message services [SMS] or unstructured supplementary service data [USSD]
- 4/16 . Communication-related supplementary services, e.g. call-transfer or call-hold

- 4/18 . 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
- 4/185 . . {by embedding added-value information into content, e.g. geo-tagging}
- 4/20 . Services signaling; Auxiliary data signalling, i.e. transmitting data via a non-traffic channel
- WARNING**
- Group [H04W 4/20](#) is impacted by reclassification into groups [H04W 4/21](#) and [H04W 4/23](#).
- Groups [H04W 4/20](#), [H04W 4/21](#), and [H04W 4/23](#) should be considered in order to perform a complete search.
- 4/203 . . {for converged personal network application service interworking, e.g. OMA converged personal network services [CPNS]}
- 4/21 . . for social networking applications
- WARNING**
- Group [H04W 4/21](#) is incomplete pending reclassification of documents from group [H04W 4/20](#).
- Groups [H04W 4/20](#) and [H04W 4/21](#) should be considered in order to perform a complete search.
- 4/23 . . for mobile advertising
- WARNING**
- Group [H04W 4/23](#) is incomplete pending reclassification of documents from group [H04W 4/20](#).
- Groups [H04W 4/20](#) and [H04W 4/23](#) should be considered in order to perform a complete search.
- 4/24 . Accounting or billing
- 4/30 . Services specially adapted for particular environments, situations or purposes
- WARNING**
- Group [H04W 4/30](#) is incomplete pending reclassification of documents from group [H04W 4/04](#).
- Groups [H04W 4/04](#) and [H04W 4/30](#) should be considered in order to perform a complete search.
- 4/33 . . for indoor environments, e.g. buildings
- WARNING**
- Group [H04W 4/33](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#) and [H04W 4/043](#).
- Groups [H04W 4/04](#), [H04W 4/043](#) and [H04W 4/33](#) should be considered in order to perform a complete search.
- 4/35 . . for the management of goods or merchandise
- WARNING**
- Group [H04W 4/35](#) is incomplete pending reclassification of documents from group [H04W 4/04](#).
- Groups [H04W 4/04](#) and [H04W 4/35](#) should be considered in order to perform a complete search.
- 4/38 . . for collecting sensor information
- WARNING**
- Group [H04W 4/38](#) is incomplete pending reclassification of documents from group [H04W 4/04](#).
- Groups [H04W 4/04](#) and [H04W 4/38](#) should be considered in order to perform a complete search.
- 4/40 . . for vehicles, e.g. vehicle-to-pedestrians [V2P]
- WARNING**
- Group [H04W 4/40](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#) and [H04W 4/046](#).
- Groups [H04W 4/04](#), [H04W 4/046](#) and [H04W 4/40](#) should be considered in order to perform a complete search.
- 4/42 . . . for mass transport vehicles, e.g. buses, trains or aircraft
- WARNING**
- Group [H04W 4/42](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#) and [H04W 4/046](#).
- Groups [H04W 4/04](#), [H04W 4/046](#) and [H04W 4/42](#) should be considered in order to perform a complete search.
- 4/44 . . . for communication between vehicles and infrastructures, e.g. vehicle-to-cloud [V2C] or vehicle-to-home [V2H]
- WARNING**
- Group [H04W 4/44](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#) and [H04W 4/046](#).
- Groups [H04W 4/04](#), [H04W 4/046](#) and [H04W 4/44](#) should be considered in order to perform a complete search.
- 4/46 . . . for vehicle-to-vehicle communication [V2V]
- WARNING**
- Group [H04W 4/46](#) is incomplete pending reclassification of documents from groups [H04W 4/04](#) and [H04W 4/046](#).
- Groups [H04W 4/04](#), [H04W 4/046](#) and [H04W 4/46](#) should be considered in order to perform a complete search.

4/48	. . . for in-vehicle communication	8/28	. . . Number portability {; Network address portability}
	WARNING	8/30	. . . Network data restoration; {Network data reliability; Network data fault tolerance}
	Group H04W 4/48 is incomplete pending reclassification of documents from groups H04W 4/04 and H04W 4/046 .	12/00	Security arrangements, e.g. access security or fraud detection; Authentication, e.g. verifying user identity or authorisation; Protecting privacy or anonymity
	Groups H04W 4/04 , H04W 4/046 and H04W 4/48 should be considered in order to perform a complete search.	12/02	. . . Protecting privacy or anonymity
4/50	. . . Service provisioning or reconfiguring	12/04	. . . Key management
4/60	. . . Subscription-based services using application servers or record carriers, e.g. SIM application toolkits	12/06	. . . Authentication
4/70	. . . Services for machine-to-machine communication [M2M] or machine type communication [MTC]	12/08	. . . Access security
4/80	. . . Services using short range communication, e.g. near-field communication [NFC], radio-frequency identification [RFID] or low energy communication	12/10	. . . Integrity
4/90	. . . Services for handling of emergency or hazardous situations, e.g. earthquake and tsunami warning systems [ETWS]	12/12	. . . Fraud detection
8/00	Network data management	16/00	Network planning, e.g. coverage or traffic planning tools; Network deployment, e.g. resource partitioning or cells structures
8/005	. . . {Discovery of network devices, e.g. terminals}	16/02	. . . Resource partitioning among network components, e.g. reuse partitioning
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	16/04	. . . Traffic adaptive resource partitioning
8/04	. . . Registration at HLR or HSS [Home Subscriber Server]	16/06	. . . Hybrid resource partitioning, e.g. channel borrowing
8/06	. . . Registration at serving network Location Register, VLR or user mobility server	16/08	. . . Load shedding arrangements
8/065	. . . {involving selection of the user mobility server}	16/10	. . . Dynamic resource partitioning
8/08	. . . Mobility data transfer	16/12	. . . Fixed resource partitioning
8/082	. . . {for traffic bypassing of mobility servers, e.g. location registers, home PLMNs or home agents}	16/14	. . . Spectrum sharing arrangements {between different networks}
8/085	. . . {involving hierarchical organized mobility servers, e.g. hierarchical mobile IP [HMIP]}	16/16	. . . for PBS [Private Base Station] arrangements
8/087	. . . {for preserving data network PoA address despite hand-offs}	16/18	. . . Network planning tools
8/10	. . . between location register and external networks	16/20	. . . for indoor coverage or short range network deployment
8/12	. . . between location registers or mobility servers	16/22	. . . Traffic simulation tools or models
8/14	. . . between corresponding nodes	16/225	. . . {for indoor or short range network}
8/16	. . . selectively restricting mobility {data} tracking	16/24	. . . Cell structures
8/18	. . . Processing of user or subscriber data, e.g. subscribed services, user preferences or user profiles; Transfer of user or subscriber data	16/26	. . . Cell enhancers {or enhancement}, e.g. for tunnels, building shadow
8/183	. . . {Processing at user equipment or user record carrier}	16/28	. . . using beam steering
8/186	. . . {Processing of subscriber group data}	16/30	. . . Special cell shapes, e.g. doughnuts or ring cells
8/20	. . . Transfer of user or subscriber data	16/32	. . . Hierarchical cell structures
8/205	. . . {Transfer to or from user equipment or user record carrier}	24/00	Supervisory, monitoring or testing arrangements
8/22	. . . Processing or transfer of terminal data, e.g. status or physical capabilities	24/02	. . . Arrangements for optimising operational condition
8/24	. . . Transfer of terminal data	24/04	. . . Arrangements for maintaining operational condition
8/245	. . . {from a network towards a terminal}	24/06	. . . Testing, {supervising or monitoring} using simulated traffic
8/26	. . . Network addressing or numbering for mobility support	24/08	. . . Testing, {supervising or monitoring} using real traffic
8/265	. . . {for initial activation of new user}	24/10	. . . Scheduling measurement reports {; Arrangements for measurement reports}
		28/00	Network traffic or resource management
		28/02	. . . Traffic management, e.g. flow control or congestion control
		28/0205	. . . {at the air interface (dynamic wireless traffic scheduling H04W 72/12)}
		28/021	. . . {in wireless networks with changing topologies, e.g. ad-hoc networks (self-organizing networks H04W 84/18)}

- 28/0215 . . {based on user or device properties, e.g. MTC-capable devices (services for machine-to-machine communication [M2M] or machine type communication [MTC] [H04W 4/70](#); wireless resource selection or allocation plan definition based on terminal or device properties [H04W 72/048](#))}
 - 28/0221 . . . {power availability or consumption}
 - 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](#))}
 - 28/0231 . . {based on communication conditions (dynamic wireless traffic scheduling definition based on channel quality criteria [H04W 72/1226](#))}
 - 28/0236 . . . {radio quality, e.g. interference, losses or delay}
 - 28/0242 . . . {Determining whether packet losses are due to overload or to deterioration of radio communication conditions}
 - 28/0247 . . {based on conditions of the access network or the infrastructure network (central resource management [H04W 28/16](#))}
 - 28/0252 . . {per individual bearer or channel (dynamic wireless traffic scheduling [H04W 72/12](#))}
 - 28/0257 . . . {the individual bearer or channel having a maximum bit rate or a bit rate guarantee}
 - 28/0263 . . . {involving mapping traffic to individual bearers or channels, e.g. traffic flow template [TFT]}
 - 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](#))}
 - 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](#))}
 - 28/0278 . . {using buffer status reports (dynamic wireless traffic scheduling definition [H04W 72/1205](#))}
 - 28/0284 . . {detecting congestion or overload during communication (monitoring arrangements [H04L 43/00](#))}
 - 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](#))}
 - 28/0294 . . {forcing collision (non-scheduled or contention based wireless access channel [H04W 74/08](#))}
 - 28/04 . . Error control
- NOTE**
- When classifying in this group, classification is also made in the appropriate groups under [H04L 1/00](#).
- 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](#))}
 - 28/065 . . . {using assembly or disassembly of packets}
 - 28/08 . . Load balancing or load distribution
 - 28/085 . . . {among bearers or channels}
 - 28/10 . . Flow control {between communication endpoints}
 - 28/12 . . . using signalling between network elements
 - 28/14 . . . using intermediate storage
 - 28/16 . . Central resource management; Negotiation of resources {or communication parameters}, e.g. negotiating bandwidth or QoS [Quality of Service]
 - 28/18 . . Negotiating wireless communication parameters
 - 28/20 . . . Negotiating bandwidth
 - 28/22 . . . Negotiating communication rate
 - 28/24 . . Negotiating SLA [Service Level Agreement]; Negotiating QoS [Quality of Service]
 - 28/26 . . Resource reservation
- 36/00 Handoff or reselection arrangements**
- NOTE**
- In this group, local priority rules supersede the first-place priority rule (FPPR) applying throughout [H04W](#)
- 36/0005 . . {Control or signalling for completing the hand-off}
 - 36/0011 . . . {for data session or connection}
 - 36/0016 {for hand-off preparation}
 - 36/0022 . . . {for transferring sessions between adjacent core network technologies}
 - 36/0027 {for a plurality of sessions or connections, e.g. multi-call, multi-bearer connections}
 - 36/0033 {with transfer of context information}
 - 36/0038 {of security context information}
 - 36/0044 {of quality context information}
 - 36/005 . . {involving radio access media independent information, e.g. MIH [Media independent Hand-off]}
 - 36/0055 . . {Transmission and use of information for re-establishing the radio link}
 - 36/0061 {of neighbor cell information}
 - 36/0066 {of control information between different types of networks in order to establish a new radio link in the target network}
 - 36/0072 {of resource information of target access point}
 - 36/0077 {of access information of target access point}
 - 36/0083 . . {Determination of parameters used for hand-off, e.g. generation or modification of neighbour cell lists}
 - 36/0088 {Scheduling hand-off measurements}
 - 36/0094 {Definition of hand-off measurement parameters}
 - 36/02 . . Buffering or recovering information during reselection {; Modification of the traffic flow during hand-off}
 - 36/023 . . {Buffering or recovering information during reselection}
 - 36/026 . . {Multicasting of data during hand-off}
 - 36/04 . . Reselecting a cell layer in multi-layered cells
 - 36/06 . . Reselecting a communication resource in the serving access point
 - 36/08 . . Reselecting an access point
 - 36/10 . . Reselecting an access point controller
 - 36/12 . . Reselecting a serving backbone network switching or routing node

- 36/14 . . Reselecting a network or an air interface
- 36/16 . . Performing reselection for specific purposes
- 36/165 . . {for improving the overall network performance (H04W 36/18 - H04W 36/22 take precedence)}
- 36/18 . . for allowing seamless reselection, e.g. soft reselection
- 36/20 . . for optimising the interference level
- 36/22 . . for handling the traffic
- 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**
- 40/005 . . {Routing actions in the presence of nodes in sleep or doze mode}
- 40/02 . . Communication route or path selection, e.g. power-based or shortest path routing
- 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
- 40/16 . . . based on interference
- 40/18 . . based on predicted events
- 40/20 . . based on geographic position or location
- 40/205 . . . {using topographical information, e.g. hills, high rise buildings}
- 40/22 . . using selective relaying for reaching a BTS [Base Transceiver Station] or an access point
- 40/24 . . Connectivity information management, e.g. connectivity discovery or connectivity update
- 40/242 . . {aging of topology database entries}
- 40/244 . . {using a network of reference devices, e.g. beaconing}
- 40/246 . . {Connectivity information discovery}
- 40/248 . . {Connectivity information update}
- 40/26 . . for hybrid routing by combining proactive and reactive routing
- 40/28 . . for reactive routing
- 40/30 . . for proactive routing
- 40/32 . . for defining a routing cluster membership
- 40/34 . . Modification of an existing route
- 40/36 . . due to handover
- 40/38 . . . adapting due to varying relative distances between nodes
- 48/00 Access restriction; Network selection; Access point selection**
- 48/02 . . Access restriction performed under specific conditions
- 48/04 . . based on user or terminal location or mobility data, e.g. moving direction, speed
- 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)}**
- 52/02 . . Power saving arrangements {(in wired systems H04L 12/12; signaling of mobile application services, e.g. low battery notifications H04W 4/20)}
- 52/0203 . . {in the radio access network or backbone network of wireless communication networks}
- 52/0206 . . . {in access points, e.g. base stations (access point devices per se H04W 88/08)}
- 52/0209 . . {in terminal devices (terminal devices per se H04W 88/02)}
- 52/0212 . . . {managed by the network, e.g. network or access point is master and terminal is slave}
- 52/0216 {using a pre-established activity schedule, e.g. traffic indication frame}
- 52/0219 {where the power saving management affects multiple terminals}
- 52/0222 {in packet switched networks}
- 52/0225 . . . {using monitoring of external events, e.g. the presence of a signal}
- 52/0229 {where the received signal is a wanted signal}
- 52/0232 {according to average transmission signal activity}
- 52/0235 {where the received signal is a power saving command}
- 52/0238 {where the received signal is an unwanted signal, e.g. interference or idle signal}
- 52/0241 {where no transmission is received, e.g. out of range of the transmitter}
- 52/0245 {according to signal strength}
- 52/0248 {dependent on the time of the day, e.g. according to expected transmission activity}
- 52/0251 . . . {using monitoring of local events, e.g. events related to user activity}
- 52/0254 {detecting a user operation or a tactile contact or a motion of the device}
- 52/0258 {controlling an operation mode according to history or models of usage information, e.g. activity schedule or time of day}

52/0261	. . . {managing power supply demand, e.g. depending on battery level}	52/247	. . . . {where the output power of a terminal is based on a path parameter sent by another terminal}
52/0264	. . . . {by selectively disabling software applications}	52/248	. . . . {where transmission power control commands are generated based on a path parameter}
52/0267	. . . . {by controlling user interface components}	52/26	. . . using transmission rate or quality of service QoS [Quality of Service]
52/027	. . . . {by controlling a display operation or backlight unit}	52/262	. . . . {taking into account adaptive modulation and coding [AMC] scheme (AMC per se H04L 1/0001)}
52/0274	. . . . {by switching on or off the equipment or parts thereof}	52/265	. . . . {taking into account the quality of service QoS}
52/0277	. . . . . {according to available power supply, e.g. switching off when a low battery condition is detected}	52/267	. . . . {taking into account the information rate}
52/028	. . . . . {switching on or off only a part of the equipment circuit blocks}	52/28	. . . using user profile, e.g. mobile speed, priority or network state, e.g. standby, idle or non transmission
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}	52/281	. . . . {taking into account user or data type priority}
52/0287	. . . . {changing the clock frequency of a controller in the equipment}	52/282	. . . . {taking into account the speed of the mobile}
52/029	. . . . . {reducing the clock frequency of the controller}	52/283	. . . . {Power depending on the position of the mobile}
52/0293	. . . . . {having a sub-controller with a low clock frequency switching on and off a main controller with a high clock frequency}	52/285	. . . . {taking into account the mobility of the user}
52/0296	. . . . {switching to a backup power supply}	52/286	. . . . {during data packet transmission, e.g. high speed packet access [HSPA]}
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	68/10	. . using simulcast notification
52/545	. . . {modifying TPC bits in special situations}	68/12	. Inter-network notification
52/56	. . . Detection of errors of TPC bits	72/00	Local resource management, e.g. wireless traffic scheduling or selection or allocation of wireless resources
52/58	. . . Format of the TPC bits	NOTE	
52/60	. . . using different transmission rates for TPC commands		In this group, local priority rules supersede the first-place priority rule (FPPR) applying throughout H04W
56/00	Synchronisation arrangements		
56/0005	. {synchronizing of arrival of multiple uplinks}	72/005	. {Resource management for broadcast services}
56/001	. {Synchronization between nodes}	72/02	. Selection of wireless resources by user or terminal
56/0015	. . {one node acting as a reference for the others}	72/04	. Wireless resource allocation
56/002	. . {Mutual synchronization}	72/0406	. . {involving control information exchange between nodes}
56/0025	. . {synchronizing potentially movable access points}	72/0413	. . . {in uplink direction of a wireless link, i.e. towards network}
56/003	. {Arrangements to increase tolerance to errors in transmission or reception timing}	72/042	. . . {in downlink direction of a wireless link, i.e. towards terminal}
56/0035	. {detecting errors in frequency or phase}	72/0426	. . . {between access points}
56/004	. {compensating for timing error of reception due to propagation delay}	72/0433	. . . {between access point and access point controlling device}
56/0045	. . {compensating for timing error by altering transmission time}	72/044	. . {where an allocation plan is defined based on the type of the allocated resource}
56/005	. . {compensating for timing error by adjustment in the receiver}	72/0446	. . . {the resource being a slot, sub-slot or frame}
56/0055	. {determining timing error of reception due to propagation delay}	72/0453	. . . {the resource being a frequency, carrier or frequency band}
56/006	. . {using known positions of transmitter and receiver}	72/046	. . . {the resource being in the space domain, e.g. beams}
56/0065	. . {using measurement of signal travel time}	72/0466	. . . {the resource being a scrambling code}
56/007	. . . {Open loop measurement}	72/0473	. . . {the resource being transmission power}
56/0075	. . . . {based on arrival time vs. expected arrival time}	72/048	. . {where an allocation plan is defined based on terminal or device properties}
56/008	. . . . . {detecting arrival of signal based on received raw signal}	72/0486	. . {where an allocation plan is defined based on load}
56/0085	. . . . . {detecting a given structure in the signal}	72/0493	. . {where an allocation plan is defined based on a resource usage policy}
56/009	. . . {Closed loop measurements}	72/06	. . {where an allocation plan is defined} based on a ranking criteria of the wireless resources
56/0095	. . {estimated based on signal strength}	72/08	. . {where an allocation plan is defined} based on quality criteria
60/00	Registration, e.g. affiliation to network; De-registration, e.g. terminating affiliation	72/082	. . . {using the level of interference}
60/005	. {Multiple registrations, e.g. multihoming}	72/085	. . . {using measured or perceived quality}
60/02	. by periodical registration	72/087	. . . {using requested quality}
60/04	. using triggered events	72/10	. . {where an allocation plan is defined} based on priority criteria
60/06	. De-registration or detaching	72/12	. {Dynamic} Wireless traffic scheduling {; Dynamically scheduled allocation on shared channel}
64/00	Locating users or terminals {or network equipment} for network management purposes, e.g. mobility management	72/1205	. . {Schedule definition, set-up or creation}
64/003	. {locating network equipment}	72/121	. . . {for groups of terminals or users}
64/006	. {with additional information processing, e.g. for direction or speed determination}	72/1215	. . . {for collaboration of different radio technologies}
68/00	Notification of users, e.g. alerting for incoming communication or change of service	72/1221	. . . {based on age of data to be sent}
68/005	. {Transmission of information for alerting of incoming communication}	72/1226	. . . {based on channel quality criteria, e.g. channel state dependent scheduling}
68/02	. Arrangements for increasing efficiency of notification or paging channel	72/1231	. . . . {using measured or perceived quality}
68/025	. . {Indirect paging}	72/1236	. . . . {using requested quality}
68/04	. multi-step notification using statistical or historical mobility data	72/1242	. . . {based on precedence or priority of the traffic information}
68/06	. using multi-step notification by changing the notification area	72/1247	. . . {based on priority of the information source or recipient}
68/08	. using multi-step notification by increasing the notification area		

- 72/1252 . . . {based on load}
- 72/1257 . . . {based on resource usage policy}
- 72/1263 . . {Schedule usage, i.e. actual mapping of traffic onto schedule; Multiplexing of flows into one or several streams; Mapping aspects; Scheduled allocation}
- 72/1268 . . . {of uplink data flows}
- 72/1273 . . . {of downlink data flows}
- 72/1278 . . {Transmission of control information for scheduling}
- 72/1284 . . . {in the uplink, i.e. from terminal to network}
- 72/1289 . . . {in the downlink, i.e. towards the terminal}
- 72/1294 {using a grant or specific channel (H04W 72/14 takes precedence)}
- 72/14 . . using a grant {or specific} channel
- 74/00 Wireless channel access, e.g. scheduled or random access**
- 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}
- 74/02 . Hybrid access techniques
- 74/04 . Scheduled {or contention-free} access
- 74/06 . . using polling
- 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}
- 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}
- 74/0891 . . . {for synchronized access}
- 76/00 Connection management**
- NOTE**
- In this main group, the first place priority rule is not applied, i.e. the common rule is applied.
- 76/10 . Connection setup
- 76/11 . . Allocation or use of connection identifiers
- 76/12 . . Setup of transport tunnels
- 76/14 . . Direct-mode setup
- 76/15 . . Setup of multiple wireless link connections
- 76/16 . . . Involving different core network technologies, e.g. a packet-switched [PS] bearer in combination with a circuit-switched [CS] bearer
- 76/18 . . Management of setup rejection or failure
- 76/19 . . Connection re-establishment
- 76/20 . Manipulation of established connections
- 76/22 . . Manipulation of transport tunnels
- 76/23 . . Manipulation of direct-mode connections
- 76/25 . . Maintenance of established connections
- 76/27 . . Transitions between radio resource control [RRC] states
- 76/28 . . Discontinuous transmission [DTX]; Discontinuous reception [DRX]
- 76/30 . Connection release
- 76/32 . . Release of transport tunnels
- 76/34 . . Selective release of ongoing connections
- 76/36 . . . for reassigning the resources associated with the released connections
- 76/38 . . triggered by timers
- 76/40 . for selective distribution or broadcast
- 76/45 . . for Push-to-Talk [PTT] or Push-to-Talk over cellular [PoC] services
- 76/50 . for emergency connections
- 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
- 80/045 . . {involving different protocol versions, e.g. MIPv4 and MIPv6}
- WARNING**
- This group is used only for indicating additional information when it is of interest for search
- 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)}
- 80/08 . Upper layer protocols {(network arrangements or communication protocols for networked applications H04L 67/00)}
- 80/085 . . {involving different upper layer protocol versions, e.g. LCS - SUPL or WSN-SOA-WSDP}
- 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)}
- 80/12 . . Application layer protocols, e.g. WAP
- 84/00 Network topologies**
- NOTE**
- In this group, local priority rules supersede the first-place priority rule (FPPR) applying throughout H04W
- 84/005 . {Moving wireless networks}
- 84/02 . Hierarchically pre-organised networks, e.g. paging networks, cellular networks, WLAN [Wireless Local Area Network] or WLL [Wireless Local Loop]

- 84/022 . . {One-way selective calling networks, e.g. wide area paging}
- 84/025 . . . {with acknowledge back capability}
- 84/027 . . . {providing paging services}
- 84/04 . . Large scale networks; Deep hierarchical networks
- 84/042 . . . {Public Land Mobile systems, e.g. cellular systems}
- 84/045 {using private Base Stations, e.g. femto Base Stations, home Node B}
- 84/047 {using dedicated repeater stations}
- 84/06 . . . Airborne or Satellite Networks
- 84/08 . . . Trunked mobile radio systems
- 84/10 . . Small scale networks; Flat hierarchical networks
- 84/105 . . . {PBS [Private Base Station] network (H04W 84/12 - H04W 84/16 take precedence)}
- 84/12 . . . WLAN [Wireless Local Area Networks]
- 84/14 . . . WLL [Wireless Local Loop]; RLL [Radio Local Loop]
- 84/16 . . . WPBX [Wireless Private Branch Exchange]
- 84/18 . Self-organising networks, e.g. ad-hoc networks or sensor networks
- 84/20 . . Master-slave {selection or change} arrangements
- 84/22 . . with access to wired networks
- 88/00** **Devices specially adapted for wireless communication networks, e.g. terminals, base stations or access point devices**
- 88/005 . {Data network PoA devices}
- 88/02 . Terminal devices
- 88/021 . . {adapted for Wireless Local Loop operation}
- 88/022 . . {Selective call receivers}
- 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**