CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H04 ELECTRIC COMMUNICATION TECHNIQUE

(NOTE omitted)

H04W WIRELESS COMMUNICATION NETWORKS (broadcast communication H04H; communication systems using wireless links for non-selective communication, e.g. wireless extensions H04M 1/72)

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.

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

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

NOTES

1. This group 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 . Services making use of location information

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

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}

4/024 . . Guidance services

4/025 . . {using location based information parameters}

4/026 . . . {using orientation information, e.g. compass}

4/027 . . . {using movement velocity, acceleration information}

4/029 . . Location-based management or tracking services

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

4/203 . . {for converged personal network application service interworking, e.g. OMA converged personal network services [CPNS]}

4/21 . . for social networking applications

4/23 . . for mobile advertising

4/24 . Accounting or billing

WARNING

Group H04W 4/24 is incomplete pending reclassification of documents from group G06Q 50/40.

Groups G06Q 50/40 and H04W 4/24 should be considered in order to perform a complete search.

4/30 . Services specially adapted for particular environments, situations or purposes
4/33 . . for indoor environments, e.g. buildings
4/35 . . for the management of goods or merchandise
4/38 . . for collecting sensor information
4/40 . . for vehicles, e.g. vehicle-to-pedestrians [V2P]
4/42 . . . for mass transport vehicles, e.g. buses, trains or aircraft
4/44 . . . for communication between vehicles and infrastructures, e.g. vehicle-to-cloud [V2C] or vehicle-to-home [V2H]
4/46 . . . for vehicle-to-vehicle communication [V2V]
4/48 . . . for in-vehicle communication
4/50 . Service provisioning or reconfiguring
4/60 . Subscription-based services using application servers or record carriers, e.g. SIM application toolkits
4/70 . Services for machine-to-machine communication [M2M] or machine type communication [MTC]
4/80 . Services using short range communication, e.g. near-field communication [NFC], radio-frequency identification [RFID] or low energy communication
4/90 . Services for handling of emergency or hazardous situations, e.g. earthquake and tsunami warning systems [ETWS]

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
8/12 . . . between location registers or mobility servers
8/14 . . . between corresponding nodes
8/16 . . . selectively restricting mobility {data} tracking
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}
8/186 . . {Processing of subscriber group data}
8/20 . . Transfer of user or subscriber data
8/205 . . . {Transfer to or from user equipment or user record carrier}
8/22 . Processing or transfer of terminal data, e.g. status or physical capabilities
8/24 . . Transfer of terminal data
8/245 . . . {from a network towards a terminal}
8/26 . Network addressing or numbering for mobility support
8/265 . . {for initial activation of new user}
8/28 . . Number portability {; Network address portability}
8/30 . Network data restoration; {Network data reliability; Network data fault tolerance}

12/00 Security arrangements; Authentication; Protecting privacy or anonymity

12/009 . {specially adapted for networks, e.g. wireless sensor networks, ad-hoc networks, RFID networks or cloud networks}
12/02 . Protecting privacy or anonymity, e.g. protecting personally identifiable information [PII]
12/03 . Protecting confidentiality, e.g. by encryption
12/033 . . of the user plane, e.g. user's traffic
12/037 . . of the control plane, e.g. signalling traffic
12/04 . Key management, e.g. using generic bootstrapping architecture [GBA]
12/041 . . Key generation or derivation
12/043 . . using a trusted network node as an anchor
12/0431 . . . Key distribution or pre-distribution; Key agreement
12/0433 . . . Key management protocols
12/047 . . without using a trusted network node as an anchor
12/0471 . . . Key exchange
12/06 . Authentication
12/062 . . Pre-authentication
12/065 . . Continuous authentication
12/068 . . {using credential vaults, e.g. password manager applications or one time password [OTP] applications}
12/069 . . using certificates or pre-shared keys
12/08 . Access security
12/082 . . using revocation of authorisation
12/084 . . using delegated authorisation, e.g. open authorisation [OAuth] protocol
12/086 . . using security domains
12/088 . . using filters or firewalls
12/10 . Integrity
12/102 . . Route integrity, e.g. using trusted paths
12/104 . . Location integrity, e.g. secure geotagging
12/106 . . Packet or message integrity
12/108 . . Source integrity
12/12 . Detection or prevention of fraud
12/121 . . Wireless intrusion detection systems [WIDS]; Wireless intrusion prevention systems [WIPS]
12/122 . . . Counter-measures against attacks; Protection against rogue devices
12/125 . . Protection against power exhaustion attacks
12/126 . . Anti-theft arrangements, e.g. protection against subscriber identity module [SIM] cloning

12/128 . . Anti-malware arrangements, e.g. protection against SMS fraud or mobile malware
12/30 . Security of mobile devices; Security of mobile applications
12/33 . . using wearable devices, e.g. using a smartwatch or smart-glasses
12/35 . . {Protecting application or service provisioning, e.g. securing SIM application provisioning}
12/37 . . Managing security policies for mobile devices or for controlling mobile applications
12/40 . Security arrangements using identity modules
12/42 . . using virtual identity modules
12/43 . . using shared identity modules, e.g. SIM sharing
12/45 . . using multiple identity modules
12/47 . . using near field communication [NFC] or radio frequency identification [RFID] modules
12/48 . . using secure binding, e.g. securely binding identity modules to devices, services or applications
12/50 . Secure pairing of devices
12/55 . . involving three or more devices, e.g. group pairing
12/60 . Context-dependent security
12/61 . . Time-dependent
12/63 . . Location-dependent; Proximity-dependent
12/64 . . . using geofenced areas
12/65 . . Environment-dependent, e.g. using captured environmental data
12/66 . . {Trust-dependent, e.g. using trust scores or trust relationships}
12/67 . . Risk-dependent, e.g. selecting a security level depending on risk profiles
12/68 . . Gesture-dependent or behaviour-dependent
12/69 . . Identity-dependent
12/71 . . . Hardware identity
12/72 . . . Subscriber identity
12/73 . . . Access point logical identity
12/75 . . . Temporary identity
12/76 . . . Group identity
12/77 . . . Graphical identity
12/79 . . . Radio fingerprint
12/80 . Arrangements enabling lawful interception [LI]

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
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

24/00 Supervisory, monitoring or testing arrangements

24/02 . Arrangements for optimising operational condition
24/04 . Arrangements for maintaining operational condition
24/06 . Testing, {supervising or monitoring} using simulated traffic
24/08 . Testing, {supervising or monitoring} using real traffic
24/10 . Scheduling measurement reports {; Arrangements for measurement reports}

28/00 Network traffic management; Network 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 72/51)}
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 72/54)}
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 72/12)}
28/0284 . . {detecting congestion or overload during communication (monitoring arrangements H04L 43/00)}
28/0289 . . {Congestion control (load shedding arrangements in network planning H04W 16/08; performing reselection for handling the traffic H04W 36/22; 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 (transferring a connection for handling the traffic H04W 36/22; wireless traffic scheduling H04W 72/12)
28/082 . . . among bearers or channels
28/0827 . . . {Triggering entity}
28/0831 . . . . {Core entity}
28/0835 . . . . {Access entity, e.g. eNB}
28/0838 . . . . {User device}
28/084 . . . among network function virtualisation [NFV] entities; among edge computing entities, e.g. multi-access edge computing
28/0846 . . . {between network providers, e.g. operators (selecting a network or a communication service H04W 40/18)}
28/0858 . . . {among entities in the uplink}
28/086 . . . among access entities
28/0861 . . . . {between base stations}
28/0862 . . . . . {of same hierarchy level}
28/0864 . . . . . {of different hierarchy levels, e.g. Master Evolved Node B [MeNB] or Secondary Evolved node B [SeNB]}
28/0865 . . . . . {of different Radio Access Technologies [RATs], e.g. LTE or WiFi}
28/0866 . . . . {between wireless and wire-based access points, e.g. via LTE and via DSL connected access points}
28/0867 . . . {among entities in the downlink}
28/0875 . . . {to or through Device to Device [D2D] links, e.g. direct-mode links}
28/088 . . . among core entities
28/0883 . . . {between entities in ad-hoc networks}
28/0892 . . . . {between different intermediate nodes}
28/09 . . . {Management thereof}
28/0908 . . . . {based on time, e.g. for a critical period only}
28/0917 . . . . {based on the energy state of entities}
28/0925 . . . . {using policies}
28/0933 . . . . . {based on load-splitting ratios}
28/0942 . . . . . {based on measured or predicted load of entities- or links}
28/095 . . . . . {based on usage history, e.g. usage history of devices}
28/0958 . . . . {based on metrics or performance parameters}
28/0967 . . . . . {Quality of Service [QoS] parameters}
28/0975 . . . . . {for reducing delays}
28/0983 . . . . . {for optimizing bandwidth or throughput}
28/0992 . . . . {based on the type of application}
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 Hand-off 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}
36/0007 . . {for multicast or broadcast services, e.g. MBMS (multicast or broadcast application services H04W 4/06; resource management for broadcast services H04W 72/30; connection management for selective distribution or broadcast H04W 76/40)}
36/0009 . . {for a plurality of users or terminals, e.g. group communication or moving wireless networks (user group management H04W 4/08; processing of subscriber group data H04W 8/186)}
36/0011 . . {for data sessions of end-to-end connection}
36/0016 . . . {Hand-off preparation specially adapted for end-to-end data sessions}
36/0019 . . . {adapted for mobile IP [MIP]}
36/0022 . . . {for transferring data sessions between adjacent core network technologies}
36/00222 . . . . {between different packet switched [PS] network technologies, e.g. transferring data sessions between LTE and WLAN or LTE and 5G}
36/00224 . . . . {between packet switched [PS] and circuit switched [CS] network technologies, e.g. circuit switched fallback [CSFB]}
36/00226 . . . . . {wherein the core network technologies comprise IP multimedia system [IMS], e.g. single radio voice call continuity [SRVCC]}
36/0027 . . . {for a plurality of data sessions of end-to-end connections, e.g. multi-call or multi-bearer end-to-end data 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 or use of information for re-establishing the radio link}
36/0058 . . . {Transmission of hand-off measurement information, e.g. measurement reports}
36/0061 . . . {of neighbour cell information}
36/0064 . . . {of control information between different access points}
36/0066 . . . {of control information between different types of networks in order to establish a new radio link in the target network}
36/0069 . . . {in case of dual connectivity, e.g. decoupled uplink/downlink}
36/00692 . . . . {using simultaneous multiple data streams, e.g. cooperative multipoint [CoMP], carrier aggregation [CA] or multiple input multiple output [MIMO] (allocation of physical resources in CoMP or in CA H04L 5/0035)}
36/00695 . . . . {using split of the control plane or user plane}
36/00698 . . . . {using different RATs}
36/0072 . . . {of resource information of target access point}
36/00725 . . . . {Random access channel [RACH]-less handover}
36/0077 . . . {of access information of target access point}
36/0079 . . . {in case of hand-off failure or rejection}
36/0083 . . {Determination of parameters used for hand-off, e.g. generation or modification of neighbour cell lists}
36/00833 . . . {Handover statistics}
36/00835 . . . {Determination of neighbour cell lists}
36/008355 . . . . {Determination of target cell based on user equipment [UE] properties, e.g. UE service capabilities}
36/008357 . . . . {Determination of target cell based on access point [AP] properties, e.g. AP service capabilities}
36/00837 . . . {Determination of triggering parameters for hand-off}
36/008375 . . . . {based on historical data}
36/00838 . . . {Resource reservation for handover}
36/0085 . . . {Hand-off measurements}
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}
36/0235 . . . {by transmitting sequence numbers, e.g. SN status transfer}
36/026 . . {Multicasting of data during hand-off}
36/03 . {Reselecting a link using a direct mode connection}
36/033 . . {in pre-organised networks}
36/035 . . {in self-organising networks}
36/037 . . {by reducing handover delay, e.g. latency}
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
36/083 . . {wherein at least one of the access points is a moving node}
36/085 . . {involving beams of access points}
36/087 . . {between radio units of access points}
36/10 . Reselecting an access point controller
36/12 . Reselecting a serving backbone network switching or routing node
36/125 . . {involving different types of service backbones}
36/13 . {Cell handover without a predetermined boundary, e.g. virtual cells}
36/14 . Reselecting a network or an air interface
36/142 . . {over the same radio air interface technology}
36/144 . . {over a different radio air interface technology}
36/1443 . . . {between licensed networks}
36/1446 . . . {wherein at least one of the networks is unlicensed}
36/16 . Performing reselection for specific purposes
36/165 . . {for reducing network power consumption (H04W 36/18 - H04W 36/22 take precedence)}
36/18 . . for allowing seamless reselection, e.g. soft reselection
36/185 . . . {using make before break}
36/20 . . for optimising the interference level
36/22 . . for handling the traffic
36/24 . Reselection being triggered by specific parameters
36/247 . . {by using coverage extension}
36/249 . . {according to timing information}
36/26 . . by agreed or negotiated communication parameters
36/28 . . . involving a plurality of connections, e.g. multi-call or multi-bearer connections
36/30 . . by measured or perceived connection quality data
36/302 . . . {due to low signal strength}
36/304 . . . {due to measured or perceived resources with higher communication quality}
36/305 . . . {Handover due to radio link failure (control signalling for hand-off failure H04W 36/0079)}
36/32 . . by location or mobility data, e.g. speed data
36/322 . . . {by location data}
36/324 . . . {by mobility data, e.g. speed data}
36/326 . . . {by proximity to another entity}
36/328 . . . {by altitude}
36/34 . Reselection control
36/36 . . by user or terminal equipment
36/362 . . . {Conditional handover}
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 (access security to prevent unauthorised access H04W 12/08)**; 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 (signalling during connection H04W 76/00)
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. Transmission Power Control [TPC] or power classes}

52/02 . Power saving arrangements
52/0203 . . {in the radio access network or backbone network of wireless communication networks}
52/0206 . . . {in access points, e.g. base stations}
52/0209 . . {in terminal devices}
52/0212 . . . {managed by the network, e.g. network or access point is leader and terminal is follower}
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}
52/0264 . . . . {by selectively disabling software applications}
52/0267 . . . . {by controlling user interface components}
52/027 . . . . . {by controlling a display operation or backlight unit}
52/0274 . . . . {by switching on or off the equipment or parts thereof}
52/0277 . . . . . {according to available power supply, e.g. switching off when a low battery condition is detected}
52/028 . . . . . {switching on or off only a part of the equipment circuit blocks}
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}
52/0287 . . . . {changing the clock frequency of a controller in the equipment}
52/029 . . . . . {reducing the clock frequency of the controller}
52/0293 . . . . . {having a sub-controller with a low clock frequency switching on and off a main controller with a high clock frequency}
52/0296 . . . . {switching to a backup power supply}
52/04 . Transmission power control [TPC]
52/06 . . TPC algorithms
52/08 . . . Closed loop power control
52/10 . . . Open loop power control
52/12 . . . Outer and inner loops
52/125 . . . . {cascaded outer loop power control}
52/14 . . . Separate analysis of uplink or downlink
52/143 . . . . {Downlink power control}
52/146 . . . . {Uplink power control}
52/16 . . . Deriving transmission power values from another channel
52/18 . . TPC being performed according to specific parameters
52/20 . . . using error rate
52/22 . . . taking into account previous information or commands

52/221 . . . . {using past power control commands}
52/223 . . . . {predicting future states of the transmission}
52/225 . . . . {Calculation of statistics, e.g. average or variance}
52/226 . . . . {using past references to control power, e.g. look-up-table}
52/228 . . . . {using past power values or information}
52/24 . . . using SIR [Signal to Interference Ratio] or other wireless path parameters
52/241 . . . . {taking into account channel quality metrics, e.g. SIR, SNR, CIR or Eb/lo}
52/242 . . . . {taking into account path loss}
52/243 . . . . {taking into account interferences}
52/244 . . . . . {Interferences in heterogeneous networks, e.g. among macro and femto or pico cells or other sector / system interference [OSI]}
52/245 . . . . {taking into account received signal strength}
52/246 . . . . {where the output power of a terminal is based on a path parameter calculated in said terminal}
52/247 . . . . {where the output power of a terminal is based on a path parameter sent by another terminal}
52/248 . . . . {where transmission power control commands are generated based on a path parameter}
52/26 . . . using transmission rate or quality of service QoS [Quality of Service]
52/262 . . . . {taking into account adaptive modulation and coding [AMC] scheme}
52/265 . . . . {taking into account the quality of service QoS}
52/267 . . . . {taking into account the information rate}
52/28 . . . using user profile, e.g. mobile speed, priority or network state, e.g. standby, idle or non-transmission
52/281 . . . . {taking into account user or data type priority}
52/282 . . . . {taking into account the speed of the mobile}
52/283 . . . . {Power depending on the position of the mobile}
52/285 . . . . {taking into account the mobility of the user}
52/286 . . . . {during data packet transmission, e.g. high speed packet access [HSPA]}
52/287 . . . . {when the channel is in stand-by}
52/288 . . . . {taking into account the usage mode, e.g. hands-free, data transmission or telephone}
52/30 . . using constraints in the total amount of available transmission power
52/32 . . . TPC of broadcast or control channels
52/322 . . . . {Power control of broadcast channels}
52/325 . . . . {Power control of control or pilot channels}
52/327 . . . . {Power control of multicast channels}
52/34 . . . TPC management, i.e. sharing limited amount of power among users or channels or data types, e.g. cell loading
52/343 . . . . {taking into account loading or congestion level}
52/346 . . . . {distributing total power among users or channels}
52/36 . . . with a discrete range or set of values, e.g. step size, ramping or offsets
52/362 . . . . {Aspects of the step size}
52/365 . . . . {Power headroom reporting}
52/367 . . . . {Power values between minimum and maximum limits, e.g. dynamic range}
52/38 . . TPC being performed in particular situations
52/383 . . . {power control in peer-to-peer links}
52/386 . . . {centralized, e.g. when the radio network controller or equivalent takes part in the power control}
52/40 . . . during macro-diversity or soft handoff
52/42 . . . in systems with time, space, frequency or polarisation diversity
52/44 . . . in connection with interruption of transmission
52/46 . . . in multi-hop networks, e.g. wireless relay networks
52/48 . . . during retransmission after error or non-acknowledgment
52/50 . . . at the moment of starting communication in a multiple access environment
52/52 . . using AGC [Automatic Gain Control] circuits or amplifiers
52/54 . . Signalisation aspects of the TPC commands, e.g. frame structure
52/545 . . . {modifying TPC bits in special situations}
52/56 . . . Detection of errors of TPC bits
52/58 . . . Format of the TPC bits
52/60 . . . using different transmission rates for TPC commands

56/00 Synchronisation arrangements

56/0005 . {synchronizing of arrival of multiple uplinks}
56/001 . {Synchronization between nodes}
56/0015 . . {one node acting as a reference for the others}
56/002 . . {Mutual synchronization}
56/0025 . . {synchronizing potentially movable access points}
56/003 . {Arrangements to increase tolerance to errors in transmission or reception timing}
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}
56/0055 . {determining timing error of reception due to propagation delay}
56/006 . . {using known positions of transmitter and receiver}
56/0065 . . {using measurement of signal travel time}
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}

60/00 Affiliation to network, e.g. registration; Terminating affiliation with the network, e.g. de-registration

60/005 . {Multiple registrations, e.g. multihoming}
60/02 . by periodical registration

60/04 . using triggered events
60/06 . De-registration or detaching

64/00 Locating users or terminals {or network equipment} for network management purposes, e.g. mobility management
64/003 . {locating network equipment}
64/006 . {with additional information processing, e.g. for direction or speed determination}

68/00 User notification, e.g. alerting and paging, for incoming communication, change of service or the like
68/005 . {Transmission of information for alerting of incoming communication}
68/02 . Arrangements for increasing efficiency of notification or paging channel
68/025 . . {Indirect paging}
68/04 . multi-step notification using statistical or historical mobility data
68/06 . using multi-step notification by changing the notification area
68/08 . using multi-step notification by increasing the notification area
68/10 . using simulcast notification
68/12 . Inter-network notification

72/00 Local resource management
72/02 . Selection of wireless resources by user or terminal

WARNING

Group H04W 72/02 is impacted by reclassification into group H04W 72/40.

Groups H04W 72/02 and H04W 72/40 should be considered in order to perform a complete search.

72/04 . Wireless resource allocation

WARNING

Group H04W 72/04 is impacted by reclassification into groups H04W 72/11, H04W 72/115 and H04W 72/40.

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

72/044 . . based on the type of the allocated resource

WARNING

Group H04W 72/044 is impacted by reclassification into group H04W 72/0457.

Groups H04W 72/044 and H04W 72/0457 should be considered in order to perform a complete search.

72/0446 . . . Resources in time domain, e.g. slots or frames
72/0453 . . . Resources in frequency domain, e.g. a carrier in FDMA
72/0457 . . . Variable allocation of band or rate

WARNING

Group H04W 72/0457 is incomplete pending reclassification of documents from group H04W 72/044.

Groups H04W 72/044 and H04W 72/0457 should be considered in order to perform a complete search.

72/046 . . . {the resource being in the space domain, e.g. beams}
72/0466 . . . {the resource being a scrambling code}
72/0473 . . . {the resource being transmission power}
72/11 . . Semi-persistent scheduling

WARNING

Group H04W 72/11 is incomplete pending reclassification of documents from group H04W 72/04.

Groups H04W 72/04 and H04W 72/11 should be considered in order to perform a complete search.

72/115 . . Grant-free or autonomous transmission

WARNING

Group H04W 72/115 is incomplete pending reclassification of documents from group H04W 72/04.

Groups H04W 72/04 and H04W 72/115 should be considered in order to perform a complete search.

72/12 . Wireless traffic scheduling

WARNING

Group H04W 72/12 is impacted by reclassification into groups H04W 72/40, H04W 72/50, H04W 72/51 and H04W 72/512.

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

72/121 . . for groups of terminals or users
72/1215 . . {for collaboration of different radio technologies}
72/1221 . . {based on age of data to be sent}
72/1263 . . Mapping of traffic onto schedule, e.g. scheduled allocation or multiplexing of flows
72/1268 . . . of uplink data flows
72/1273 . . . of downlink data flows
72/20 . Control channels or signalling for resource management

WARNING

Group H04W 72/20 is impacted by reclassification into groups H04W 72/25, H04W 72/27 and H04W 72/29.

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

72/21 . . in the uplink direction of a wireless link, i.e. towards the network

72/23 . . in the downlink direction of a wireless link, i.e. towards a terminal

WARNING

Group H04W 72/23 is impacted by reclassification into groups H04W 72/231 and H04W 72/232.

Groups H04W 72/23, H04W 72/231 and H04W 72/232 should be considered in order to perform a complete search.

72/231 . . . the control data signalling from the layers above the physical layer, e.g. RRC or MAC-CE signalling

WARNING

Group H04W 72/231 is incomplete pending reclassification of documents from group H04W 72/23.

Groups H04W 72/23 and H04W 72/231 should be considered in order to perform a complete search.

72/232 . . . the control data signalling from the physical layer, e.g. DCI signalling

WARNING

Group H04W 72/232 is incomplete pending reclassification of documents from group H04W 72/23.

Groups H04W 72/23 and H04W 72/232 should be considered in order to perform a complete search.

72/25 . . between terminals via a wireless link, e.g. sidelink

WARNING

Group H04W 72/25 is incomplete pending reclassification of documents from group H04W 72/20.

Groups H04W 72/20 and H04W 72/25 should be considered in order to perform a complete search.

72/27 . . between access points

WARNING

Group H04W 72/27 is incomplete pending reclassification of documents from group H04W 72/20.

Groups H04W 72/20 and H04W 72/27 should be considered in order to perform a complete search.

72/29 . . between an access point and the access point controlling device

WARNING

Group H04W 72/29 is incomplete pending reclassification of documents from group H04W 72/20.

Groups H04W 72/20 and H04W 72/29 should be considered in order to perform a complete search.

72/30 . Resource management for broadcast services

72/40 . Resource management for direct mode communication, e.g. D2D or sidelink

WARNING

Group H04W 72/40 is incomplete pending reclassification of documents from groups H04W 72/02, H04W 72/04 and H04W 72/12.

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

72/50 . Allocation or scheduling criteria for wireless resources

WARNING

Group H04W 72/50 is incomplete pending reclassification of documents from group H04W 72/12.

Groups H04W 72/12 and H04W 72/50 should be considered in order to perform a complete search.

72/51 . . based on terminal or device properties

WARNING

Group H04W 72/51 is incomplete pending reclassification of documents from group H04W 72/12.

Group H04W 72/51 is also impacted by reclassification into group H04W 72/512.

Groups H04W 72/12, H04W 72/51 and H04W 72/512 should be considered in order to perform a complete search.

72/512 . . . for low-latency requirements, e.g. URLLC

WARNING

Group H04W 72/512 is incomplete pending reclassification of documents from groups H04W 72/12 and H04W 72/51.

Groups H04W 72/12, H04W 72/51 and H04W 72/512 should be considered in order to perform a complete search.

72/52 . . based on load

72/53 . . based on regulatory allocation policies

72/535 . . {based on resource usage policies}

72/54 . . based on quality criteria

WARNING

Group H04W 72/54 is impacted by reclassification into group H04W 72/541.

Groups H04W 72/54 and H04W 72/541 should be considered in order to perform a complete search.

72/541 . . . using the level of interference

WARNING

Group H04W 72/541 is incomplete pending reclassification of documents from group H04W 72/54.

Groups H04W 72/54 and H04W 72/541 should be considered in order to perform a complete search.

72/542 . . . using measured or perceived quality

72/543 . . . based on requested quality, e.g. QoS
72/56 . . based on priority criteria

WARNING

Group H04W 72/56 is impacted by reclassification into group H04W 72/566.

Groups H04W 72/56 and H04W 72/566 should be considered in order to perform a complete search.

72/563 . . . of the wireless resources
72/566 . . . of the information or information source or recipient

WARNING

Group H04W 72/566 is incomplete pending reclassification of documents from group H04W 72/56.

Groups H04W 72/56 and H04W 72/566 should be considered in order to perform a complete search.

72/569 . . . . {of the traffic information}

74/00 Wireless channel 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}
74/02 . Hybrid access
74/04 . Scheduled access (hybrid access H04W 74/02)
74/06 . . using polling
74/08 . Non-scheduled access, e.g. ALOHA (hybrid access H04W 74/02)
74/0808 . . using carrier sensing, e.g. carrier sense multiple access [CSMA]
74/0816 . . . with collision avoidance
74/0825 . . . {with collision detection}
74/0833 . . Random access procedures, e.g. with 4-step access

WARNING

Group H04W 74/0833 is impacted by reclassification into groups H04W 74/0836 and H04W 74/0838.

Groups H04W 74/0833, H04W 74/0836 and H04W 74/0838 should be considered in order to perform a complete search.

74/0836 . . . with 2-step access

WARNING

Group H04W 74/0836 is incomplete pending reclassification of documents from group H04W 74/0833.

Groups H04W 74/0833 and H04W 74/0836 should be considered in order to perform a complete search.

74/0838 . . . using contention-free random access [CFRA]

WARNING

Group H04W 74/0838 is incomplete pending reclassification of documents from group H04W 74/0833.

Groups H04W 74/0833 and H04W 74/0838 should be considered in order to perform a complete search.

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

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

80/02 . Data link layer protocols
80/04 . Network layer protocols, e.g. mobile IP [Internet Protocol]
80/045 . . {involving different protocol versions, e.g. MIPv4 and MIPv6}
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 [Wireless Application Protocol]

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 (space-based or airborne stations H04B 7/185)
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 . . Leader-follower 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 devices; 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