

CPC COOPERATIVE PATENT CLASSIFICATION

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

NOTES

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

4/00	{Mobile application} services or facilities specially adapted for wireless communication networks {(network arrangements or communication protocols for networked applications H04L 67/00 ; network arrangements or protocols for real-time communications H04L 65/00 ; network arrangements or network protocols for addressing or naming H04L 61/00 ; application independent communication protocol aspects and techniques in packet data networks H04L 69/00 ; network architectures or network communication protocols for network security H04L 63/00 ; wireless network security H04W 12/00 ; message switching systems H04L 12/58 ; arrangements for broadcast or conference H04L 12/18 ; telephonic communication, substation extension arrangements, cordless telephones, portable communication terminals with improved user interface to control a main telephone operation mode or to indicate the communication status H04M 1/72522 ; automatic or semi-automatic exchanges for telephonic communication - systems providing special services or facilities to subscribers H04M 3/42)}	4/001	• {Provisioning or reconfiguring application services, e.g. OMA DM (network management H04L 12/24 ; network arrangements or communication protocols for networked applications involving the movement of software or configuration parameters, e.g. applets H04L 67/34 ; program loading or initiating G06F 9/445 ; mobile agents G06F 9/4862)}
		4/003	• {Mobile application execution environments for application services, e.g. communicating with application store or appstore servers in the application service network and <u>vice versa</u> , 3GPP SIM Application toolkit [SAT], 3GPP OSA or 3GPP MEXE (processing of user or subscriber data at user equipment or user record carrier H04W 8/183)}
		4/005	• {for Machine-to-Machine communication [M2M, MTC], e.g. 3GPP M2M, OMA M2M, 3GPP MTC or Wireless Sensor Networks [WSN] (self-organizing networks H04W 84/18 ; network arrangements or communication protocols for networked applications adapted for proprietary or special purpose networking environments, e.g. medical networks, sensor networks, networks in a car, remote metering networks H04L 67/12 ; mechanical means for transferring the output of a sensing member G01D 5/00)}
		4/006	• • {using cooperative applications for harvesting, aggregating or forwarding data, e.g. data fusion, aggregation or diffusion in WSN, master/slave node hierarchy negotiations in WSN}
		4/008	• {using short range communication, e.g. NFC, RFID or PAN (telephonic substation extension arrangements interfacing with an external accessory using a two-way short-range wireless interface H04M 1/7253 ; mechanical means for transferring the output of a sensing member G01D 5/00 ; near-field transmission systems H04B 5/00)}

NOTES

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

- 4/02 . {Mobile application} Services making use of the location of users or terminals {, e.g. OMA SUPL, OMA MLP or 3GPP LCS} (mobility data transfer [H04W 8/08](#); access restriction based on user location or mobility data [H04W 48/04](#); registration, e.g. affiliation to network, de-registration, e.g. terminating affiliation [H04W 60/00](#); locating users or terminals for network management purpose [H04W 64/00](#); navigation or navigational instruments [G01C 21/00](#); radio direction-finding, radio navigation, determining distance or velocity by use of radio waves, locating or presence-detecting by use of the reflection or re-radiation of radio waves or analogous arrangements using other waves [G01S](#))
- 4/021 . . {based on location controlled areas, e.g. geofencing}
- 4/022 . . . {with dynamic range variability}
- 4/023 . . {using mutual or relative location information between multiple location based services [LBS] targets or of distance thresholds}
- 4/025 . . {using location based information parameters}
- 4/026 . . . {using orientation information, e.g. compass}
- 4/027 . . . {using movement velocity, acceleration information}
- 4/028 . . . {using historical or predicted position information, e.g. trajectory data}
- 4/04 . . {using association of physical positions and logical data} in a dedicated environment, e.g. buildings or vehicles
- 4/043 . . . {using ambient awareness, e.g. involving buildings using floor or room numbers}
- 4/046 . . . {involving vehicles, e.g. floating traffic data [FTD] or vehicle traffic prediction}
- 4/06 . Selective distribution or broadcast {application services; Mobile application} services to user groups; One-way selective calling services {(connection management for selective distribution or broadcast [H04W 76/002](#); resource management for broadcast services [H04W 72/005](#))}
- 4/08 . . User group management {(group management mechanisms in peer-to-peer network applications [H04L 67/1044](#); processing of subscriber group data [H04W 8/186](#))}
- 4/10 . . Push-to-Talk {mobile application services} or Push-on-Call {mobile application} services {(arrangements for real-time multimedia Push-to-X-Services [H04L 65/4061](#); connection management for Push-to-Talk or Push-on-Call services [H04W 76/005](#))}
- 4/12 . {Mobile application service signalling using} messaging, e.g. SMS [Short Message Service]; {Mobile application service signalling using} mailboxes; {Mobile application service signalling using} announcements, e.g. informing users on the status or progress of a communication request {(message switching systems [H04L 12/58](#); voice mail systems [H04M 3/533](#); arrangements for providing announcements [H04M 3/487](#))}
- 4/14 . . {Mobile application service signalling using} short messaging services, e.g. SMS or USSD [Unstructured Supplementary Service Data]
- 4/16 . {Mobile application service signalling using} communication-related supplementary services, e.g. call-transfer or call-hold {(automatic or semi-automatic exchange systems providing special services or facilities to subscribers [H04M 3/42](#))}
- 4/18 . {Customizing content of application services or} information format or content conversion, e.g. adaptation by the network of the transmitted or received information for the purpose of wireless delivery to users or terminals {(network arrangements or communication protocols for networked applications involving intermediate processing or storage in the network, e.g. proxy, [H04L 67/28](#); message adaptation based on network or terminal capabilities for message switching systems [H04L 12/5825](#))}
- 4/185 . . {by embedding added-value information into content, e.g. geo-tagging (intermediate arrangements for adding application control or application functional data [H04L 67/2804](#))}
- 4/20 . {Signalling of application services or} auxiliary data signalling, i.e. transmitting data via a non-traffic channel
- 4/203 . . {for converged personal network application service interworking, e.g. OMA converged personal network services [CPNS]}
- 4/206 . . {for socializing or targeting users of the same wireless application service, e.g. joint gesture signalling or mobile advertising signalling (marketing [G06Q 30/02](#); input arrangements for transferring data to be processed into a form capable of being handled by the computer for entering handwritten data [G06F 3/04883](#))}
- 4/22 . {Mobile application service} emergency connection handling {or mobile application services handling urgent or hazardous situations, e.g. 3GPP earthquake and tsunami warning system [ETWS] (connection management for emergency connection handling [H04W 76/007](#); centralised arrangements for answering calls for emergency applications requiring operator intervention [H04M 3/5116](#))}
- 4/24 . Accounting or billing
- 4/26 . . Usage measurement
- 8/00 Network data management**
- 8/005 . {Discovery of network devices, e.g. terminals}
- 8/02 . Processing of mobility data, e.g. registration information at HLR [Home Location Register] or VLR [Visitor Location Register]; Transfer of mobility data, e.g. between HLR, VLR or external networks
- 8/04 . . Registration at HLR or HSS [Home Subscriber Server]
- 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	24/06	. Testing, {supervising or monitoring} using simulated traffic
8/14	. . . between corresponding nodes	24/08	. Testing, {supervising or monitoring} using real traffic
8/16	. . . selectively restricting mobility {data} tracking	24/10	. Scheduling measurement reports; {Arrangements for measurement reports}
8/18	. Processing of user or subscriber data, e.g. subscribed services, user preferences or user profiles; Transfer of user or subscriber data		
8/183	. . {Processing at user equipment or user record carrier}	28/00	Network traffic or resource management
8/186	. . {Processing of subscriber group data}	28/02	. Traffic management, e.g. flow control or congestion control
8/20	. . Transfer of user or subscriber data	28/0205	. . {at the air interface (dynamic wireless traffic scheduling H04W 72/12)}
8/205	. . . {Transfer to or from user equipment or user record carrier}	28/021	. . {in wireless networks with changing topologies, e.g. ad-hoc networks (self-organizing networks H04W 84/18)}
8/22	. Processing or transfer of terminal data, e.g. status or physical capabilities	28/0215	. . {based on user or device properties, e.g. MTC-capable devices (mobile application services or facilities specially adapted for wireless communication networks for machine-to-machine communication H04W 4/005 ; wireless resource selection or allocation plan definition based on terminal or device properties H04W 72/048)}
8/24	. . Transfer of terminal data		
8/245	. . . {from a network towards a terminal}	28/0221	. . . {power availability or consumption}
8/26	. Network addressing or numbering for mobility support	28/0226	. . {based on location or mobility (handoff or reselection H04W 36/00 ; mobile application services making use of the location of users or terminals H04W 4/02)}
8/265	. . {for initial activation of new user}	28/0231	. . {based on communication conditions (dynamic wireless traffic scheduling definition based on channel quality criteria H04W 72/1226)}
8/28	. . Number portability; {Network address portability}	28/0236	. . . {radio quality, e.g. interference, losses or delay}
8/30	. Network data restoration; {Network data reliability; Network data fault tolerance}	28/0242	. . . {Determining whether packet losses are due to overload or to deterioration of radio communication conditions}
12/00	Security arrangements, e.g. access security or fraud detection; Authentication, e.g. verifying user identity or authorisation; Protecting privacy or anonymity	28/0247	. . {based on conditions of the access network or the infrastructure network (central resource management H04W 28/16)}
12/02	. Protecting privacy or anonymity	28/0252	. . {per individual bearer or channel (dynamic wireless traffic scheduling H04W 72/12)}
12/04	. Key management	28/0257	. . . {the individual bearer or channel having a maximum bit rate or a bit rate guarantee}
12/06	. Authentication	28/0263	. . . {involving mapping traffic to individual bearers or channels, e.g. traffic flow template [TFT]}
12/08	. Access security	28/0268	. . {using specific QoS parameters for wireless networks, e.g. QoS class identifier [QCI] or guaranteed bit rate [GBR] (negotiating SLA or negotiating QoS H04W 28/24)}
12/10	. Integrity	28/0273	. . {adapting protocols for flow control or congestion control to wireless environment, e.g. adapting transmission control protocol [TCP] (wireless network protocols or protocol adaptations to wireless operation, e.g. wireless application protocol H04W 80/00)}
12/12	. Fraud detection	28/0278	. . {using buffer status reports (dynamic wireless traffic scheduling definition H04W 72/1205)}
16/00	Network planning, e.g. coverage or traffic planning tools; Network deployment, e.g. resource partitioning or cells structures	28/0284	. . {detecting congestion or overload during communication (monitoring arrangements H04L 12/2602)}
16/02	. Resource partitioning among network components, e.g. reuse partitioning	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)}
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 optimizing operational condition		
24/04	. Arrangements for maintaining operational condition		

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

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

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

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

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

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