

H04W

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

Definition statement

This place covers:

- Communication networks deploying an infrastructure for mobility management of wireless users connected thereto, e.g. cellular networks, wireless LANs.
- Self organizing wireless communication networks, e.g. ad-hoc networks.
- Wireless access networks e.g. Wireless Local Loop.
- Said networks being used for selectively establishing one or a plurality of communication links between a desired number of users or between users and network equipments for the purpose of transferring information via these communication links.
- Arrangements or techniques for planning, deploying wireless networks.
- Arrangements or techniques specially adapted for wireless service provisioning.
- Arrangements or techniques specially adapted for wireless network operation.

References

Limiting references

This place does not cover:

Broadcast communication	H04H
Communication systems using wireless links for non-selective communication, e.g. wireless extensions	H04M 1/72

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for programme control, e.g. control unit	G06F 9/00
Wireless sensing of record carriers	G06K 7/10
Signalling or calling systems	G08B
Traffic control systems	G08G
Transceivers, i.e. devices in which transmitter and receiver form a structural unit and in which at least one part is used for functions of transmitting and receiving	H04B 1/38
Spread spectrum techniques in general	H04B 1/69
Near-field transmission systems, e.g. inductive loop type	H04B 5/00
Control of transmission; Equalising	H04B 7/005
Diversity systems	H04B 7/02
Space-based or airborne stations	H04B 7/185
For communication between two or more posts at least one of which is mobile	H04B 7/26
Transmission systems employing electromagnetic waves other than radio waves	H04B 10/00

Transmission systems employing sonic, ultrasonic or infrasonic waves	H04B 11/00
Transmission systems characterised by the medium used for transmission	H04B 13/00
Multiplex communication	H04J
Arrangements for detection or preventing errors in the information received	H04L 1/00
Arrangements affording multiple use of the transmission path	H04L 5/00
Arrangements for synchronising receiver with transmitter	H04L 7/00
Cryptographic protocols	H04L 9/00
Data switching networks	H04L 12/00
Modulated-carrier systems	H04L 27/00
Network security protocols	H04L 63/00
Media handling, encoding, streaming or conversion	H04L 65/60
Network protocols for data switching network services	H04L 67/01
Telephonic communication	H04M
Telephonic substation equipment	H04M 1/00
Telephonic automatic or semi-automatic exchanges	H04M 3/00
Metering arrangements; Time controlling arrangements; Time- indicating arrangements	H04M 15/00
Prepayment telephone systems	H04M 17/00
Arrangements using wireless links for the sole purpose of telecontrol or telemetry systems	H04Q 9/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Access point	means an equipment providing wireless user access to a backbone network by terminating a radio link.
BSC	Base Station Controller
BTS	Base Transceiver Station
Backbone network	designates equipment(s) for connecting one or several wireless access points to a wired or wireless infrastructure in order to allow communication(s) between users' inside or outside the wireless network.
Care-of-address	designates the termination point of a tunnel toward a mobile node, for datagrams forwarded to the mobile node while it is away from home.
Cellular	an infrastructure deployment involving partitioning geographical areas in a plurality of sub-areas (cells) for the purpose of reusing wireless resources.
Communication link	means a physical or logical connection selectively established for the purpose of conveying messages or information between users or networks.
Connection	means network resource(s) allocated or reserved for an affiliated user.

Connected state	designates the state of a user/terminal having active i.e. allocated logical traffic/control channel, dormant or suspended, i.e. without allocated logical channels but with maintained service instances. It also incorporates context (PDP context), User Plane, Control Plane operations.
Control channel	transports control information used to control the function of the network element. ("signalling channel", e.g. paging channel, broadcast channel, pilot channel).
Core network, CN	3GPP standard terminology. PLMN architecture is divided into Core Network (CN) and Access Network (AN). Whereas Access Network comprises GERAN (BSS for GSM), UTRAN (RNS) and E-UTRAN, Core Network is logically subdivided into a Circuit Switched (CS) domain, a Packet Switched (PS) domain and an IP Multimedia (IM) subsystem.
Correspondent node	a peer with which a mobile node is communicating. A correspondent node may be either mobile or stationary.
Data network PoA [Point of Attachment]	entity within wireless network or mobility management infrastructure providing access to a data network for a wireless user.
Direct mode	establishing a direct communication link between user/terminal; the link can be established using an intermediate node.
Domain;CS domain, PS domain	3GPP standard terminology. Circuit Switched domain (CS domain) refers to the set of all core network entities offering "circuit switched type of connection" for user traffic and for the related signalling. Dedicated network resources are allocated at connection establishment and released at connection release. Entities specific to the CS domain are: MSC, GMSC, VLR. The Packet Switched domain (PS domain, Packet domain) refers to the set of all core network entities offering "packet switched type of connection" for user traffic and for supporting the related signalling. Transports user information using autonomous concatenation of bits called packets: each packet can be routed independently from the previous one. PS domain includes General Packet Radio Service (GPRS) and Evolved Packet Core (EPC). Entities specific to the PS domain are: SGSN, GGSN, PDN GW, S-GW, MME, HSS. CS and PS domains also have common network entities: e.g. HSS, HLR
Downlink	means the wireless link from a wireless access point or network towards the user or terminal equipment (see also "uplink").
Fixed allocation (of a dedicated resource)	allocation of a resource that is not changed with each frame or time slot. It is also named "persistent or semi-persistent scheduling".
Hand-off, handover	a change of radio link or data network point of attachment, while a connection is ongoing.
Home network	designates the network performing functions at a permanent location regardless of the location of the user's access point. The home network is responsible for subscription information management and for specific services not provided by the serving network; dedicated equipment used therefore is designed by HLR (Home Location Register); also Home Agent, Home Subscriber Server.

Idle state	designates the state of a user/terminal having no active traffic/ control channel and no active service instances but being affiliated to the network. (See also "null state")
Mobility binding	designates the association of a home address with a care-of address, along with the remaining lifetime of that association.
Mobility data	information obtained by the network or exchanged by network components, in particular user affiliation or location data, to be used in providing a network service
Mobility management	designates techniques or arrangements allowing operation of, or services to be provided to, a user capable of selecting or changing his point of attachment to the network.
Mobility server	A network functional entity acting as an established reference point in location registration operations by (or on behalf of) a mobile user/terminal.
Mobile node	designates a host or router that changes its point of attachment from one network or subnetwork to another, without changing its constant home IP address.
Multi-call	means a plurality of communication links established over one or a plurality of networks for transferring information to one user/ terminal.
Multiplexing	sorting packets of flows onto one or several channels in time, frequency, code and space division. better or space division.
Network	means the physical or logical entities involved in providing communication services to users.
Network security	(see Tanenbaum) roughly means the four intertwined areas: secrecy, authentication, nonrepudiation and integrity control for a interconnected collection of autonomous nodes, e.g, computers
Null state	designates the state of a user/terminal having no active traffic/ control channel and no active service instances.
Originating	means a user/terminal acting as a requester for communication towards a wireless access point.
Packet domain PLMN backbone network	The 3GPP standard terminology defines two kinds of packet domain PLMN backbone networks: The intra-PLMN backbone network is the IP network comprising routers interconnecting ps domain(s) within the same PLMN. The inter-PLMN backbone network is the IP network comprising routers interconnecting ps domain(s) of different PLMNs.
Paging	Notifying a terminating user of a communication event.
Paging service	one-way selective calling service.
Partitioning	means distributing/committing specific resources to a particular/ specific network component.
Polling	questioning for needed transmission resources and according instant allocation for immediate transmission.
Private networks	designates networks owned and operated by non-public authorities.
QoS	Quality of Service
Resource allocation	means allocation of a resource to a communication.

Resource distribution	means committing a resource to an entity for future allocation thereof for communication.
RNC	Radio Network Controller
Scheduling	means establishing an order of transmission of communication information based on precedence or priority policies.
Scheduled access	access to a wireless resource follows a schedule or is performed in a defined order.
Scheduled allocation	resource allocation is continuously changed or adapted during a connection according to a transmission schedule. This requires the usage of a shared channel.
(semi-) persistent scheduling	allocation of resources that is persistent for a number of (consecutive) time slots or frames according to a transmission schedule. This requires the usage of a shared channel.
Serving network	designate the part of the network to which the access point providing user's access is connected. The serving network is responsible for path finding and transport of users data; dedicated equipment used therefore is designed by VLR (Visitor Location Register; also Foreign Agent, Visiting Subscriber Server.
SLA	Service Level Agreement
Subscriber	means an entity recognized and authorized as user.
Terminal	means the equipment acting as/or on behalf of a user.
Terminating	means a user/terminal specified as a recipient for communication from within or via a wireless network.
Tracking	monitoring a user or terminal activity in the network for purposes of gathering, e.g. location, activity or status information.
Traffic channel	transports communication information (user data) to and from one or several users.
Trigger, triggering	the act of initiating an action. This could be caused by certain criteria or events or involve the exchange of information.
(transmission) scheduling	defines an order of transmission of one or several data flows in time, frequency, code and space dimension.
Uplink	means the wireless link from the user or terminal equipment towards a wireless network or access point (see also "Downlink").
User	means an entity acting as an information source (sender, transmitter, server) or information sink (recipient, receiver, client).
Wireless extension	means equipment using a pre-defined dedicated wireless link.
Wireless link	means a communication link established via radio, infrared, inductive or other electromagnetic radiation.
Wireless resource	means a communication link using a specific frequency, time, code or space (or combination thereof).
Zoned	designates an infrastructure deployment involving partitioning geographical areas in a plurality of sub-areas (zones, cells) for the purpose of reusing wireless resources.

H04W 4/00

Services specially adapted for wireless communication networks; Facilities therefor

Definition statement

This place covers:

Providing wireless communication services by or via one or a plurality of network equipment to one or a plurality of affiliated user or terminal equipment.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Wireless network security	H04W 12/00
Charging, metering or billing arrangements specially adapted for data communications	H04L 12/14
Broadcast or conference in data switching networks	H04L 12/18
Message switching systems	H04L 51/00
Network arrangements or protocols	H04L 61/00
Network architectures or network communications	H04L 63/00
Network arrangements or protocols in real time	H04L 65/00
Network arrangements or communication protocols for networked applications	H04L 67/00
Application independent communication protocol aspects	H04L 69/00
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 1/72403
Telephonic communication systems providing special services or facilities to subscriber	H04M 3/42
Arrangements for metering, time-control or time indication and metering, charging or billing arrangements for voice wireline or wireless communications	H04M 15/00
Prepayment of wireline communication systems, wireless communication systems or telephone systems	H04M 17/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Affiliated	means a user or terminal being recognized by a network and/or authorized to use network resources
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H04W 4/06

Selective distribution of broadcast services, e.g. multimedia broadcast multicast service [MBMS]; Services to user groups; One-way selective calling services

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Resource management for broadcast services	H04W 72/30
Connection management for selective distribution or broadcast	H04W 76/40

H04W 4/10

Push-to-Talk [PTT] or Push-On-Call services

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Connection management for Push-to-Talk [PTT] or Push-to-Talk over cellular [PoC] services	H04W 76/45
Arrangements for real-time multimedia Push-to-X-Services	H04L 65/4061

H04W 4/24

Accounting or billing

Relationships with other classification places

When documents disclose aspects of charging or billing in combination with aspects of wired or wireless data or voice communication, e.g. voice over IP (VoIP, VoLTE), then multiple classification should be considered in groups [H04L 12/14](#), [H04M 15/00](#), [H04M 17/00](#) or [H04W 4/24](#).

H04W 8/00

Network data management

Definition statement

This place covers:

Managing network data, e.g. storing, updating, transferring, obtaining or exchanging operation data, mobility data, user service data or terminal service data.

References**Limiting references**

This place does not cover:

Connection management, e.g. connection set-up, manipulation or release.	H04W 76/00
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H04W 8/005**{Discovery of network devices, e.g. terminals}****Definition statement***This place covers:*

(RE-)scanning for and (re-)discovery of terminals or devices; inquiry methods

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Connectivity information management, e.g. connectivity discovery or update	H04W 40/24
Discovering, processing access restriction or access information	H04W 48/16
Network service discovery by a Service Manager	H04L 41/5058
Discovery or management thereof, e.g. service location protocol [SLP] or web services	H04L 67/51
Network services indicating network or usage conditions on the user display	H04L 67/75

H04W 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****Definition statement***This place covers:*

Processing, e.g. storing, updating of mobility data; Transfer of mobility data.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Network layer protocols, e.g. mobile IP [Internet Protocol]	H04W 80/04
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H04W 8/04**Registration at HLR or HSS [Home Subscriber Server]****Definition statement***This place covers:*

Registration of user or terminal affiliation or location information.

H04W 8/06**Registration at serving network Location Register, VLR or user mobility server****Definition statement***This place covers:*

Temporary or semi-permanent registration of user or terminal mobility data at a user mobility server not being the permanent reference point for mobile data queries.

H04W 8/065**{involving selection of the user mobility server}****Definition statement***This place covers:*

Selecting a user mobility server for registration.

H04W 8/08**Mobility data transfer****Definition statement***This place covers:*

Transfer of mobility data, e.g. to network components or external parties.

H04W 8/082**{for traffic bypassing of mobility servers, e.g. location registers, home PLMNs or home agents}****Definition statement***This place covers:*

Transfer of mobility data to forward traffic data directly to the mobile node without having to detour traffic data through the home network e.g. route optimization, local breakout

H04W 8/085**{involving hierarchical organized mobility servers, e.g. hierarchical mobile IP [HMIP]}****Definition statement***This place covers:*

Transfer of mobility data in a network, wherein mobility servers are hierarchical components of a mobility management scheme.

H04W 8/087**{for preserving data network PoA address despite hand-offs}****Definition statement***This place covers:*

Transfer of mobility data on the basis of a localised network-based mobility management scheme, where the user terminal preserves its data network address, e.g. HAWAII and NETLMM.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Modification of an existing route due to handover	H04W 40/36
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H04W 8/10**between location register and external networks****Definition statement***This place covers:*

Transfer of mobility data between external networks and a location register or mobility server, e.g. HSS.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Interfaces specially adapted for wireless communication networks, inter-networking arrangements	H04W 92/02
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H04W 8/12**between location registers or mobility servers****Definition statement***This place covers:*

Transfer of mobility data between location registers or mobility servers e.g. for the purpose of sharing the load between mobility servers, or for supporting roaming.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Interfaces specially adapted for wireless communication networks, interfaces between backbone network devices	H04W 92/24
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H04W 8/14**between corresponding nodes****Definition statement**

This place covers:

Transfer of mobility data between corresponding nodes, e.g. among communicating users or terminals.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Interfaces specially adapted for wireless communication networks, interfaces between hierarchical similar devices	H04W 92/16
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H04W 8/16**selectively restricting mobility {data} tracking****Definition statement**

This place covers:

Selectively restricting the tracking of mobility data by the network or user, e.g. restricting the transmission of affiliation or location information, or restricting the transfer of tracking information.

H04W 8/18**Processing of user or subscriber data, e.g. subscribed services, user preferences or user profiles; Transfer of user or subscriber data****Definition statement**

This place covers:

Processing or transferring of user data, e.g. storing, updating, deleting, and transferring user profiles, service data, and preferences; Processing or transferring of subscriber data, e.g. data concerning subscribed services, subscriber profiles.

Storage arrangements therefore including dedicated record carriers.

References**Limiting references**

This place does not cover:

Devices for signalling identity of wanted subscriber with provision for storing more than one subscriber number at a time using static electronic memories	H04M 1/2745
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Registration, e.g. affiliation to network; De-registration, e.g. terminating affiliation	H04W 60/00
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Profiles in network data switching protocols	H04L 67/30
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H04W 8/183

{Processing at user equipment or user record carrier}

Definition statement

This place covers:

Processing, e.g. storing, updating, deleting, at user equipment or record carrier; logical bundling of record carrier and subscriber equipment, e.g. SIM-lock.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Fraud detection as security arrangement	H04W 12/12
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H04W 8/186

{Processing of subscriber group data}

Definition statement

This place covers:

- Affiliation of subscribers to a group
- De-affiliation of subscribers from a group
- Creation and administration of subscriber groups
- Transfer, processing, and update of subscriber group information

This subgroup covers all kinds of subscriber groups.

Network addressing or numbering for mobility support	H04W 8/26
Self-organizing networks, e.g. ad-hoc networks or sensor networks	H04W 84/18

H04W 8/20

Transfer of user or subscriber data

Definition statement

This place covers:

Arrangements for transfer of user data or subscriber data, e.g. between network databases, subscriber equipment or between network databases and authorized 3d parties.

H04W 8/205**{Transfer to or from user equipment or user record carrier}****Definition statement***This place covers:*

Transfer is performed to or from user equipment or between user equipment and user record carrier.

H04W 8/22**Processing or transfer of terminal data, e.g. status or physical capabilities****Definition statement***This place covers:*

Processing terminal data, e.g. storing, updating, deleting.

Transferring terminal data, e.g. data related to condition, physical capabilities. Transferring terminal status, e.g. lost, stolen.

References**Limiting references***This place does not cover:*

Devices for signalling identity of wanted subscriber with provision for storing more than one subscriber number at a time using static electronic memories	H04M 1/2745
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Allocation plan definition, set-up or creation based on terminal or device properties	H04W 72/51
Proprietary protocols involving control of end-device applications	H04L 67/125

H04W 8/24**Transfer of terminal data****Definition statement***This place covers:*

Transfer of terminal data, e.g. between network and terminal equipment.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Programme loading or initiating G06F 9/445 ; Power saving arrangements H04W 52/02 ; De-registration or Detaching	H04W 60/06
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Portable communication terminals with means for supporting locally a plurality of applications to increase the functionality provided by software upgrading or downloading	H04M 1/72406
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H04W 8/245

{from a network towards a terminal}

Definition statement

This place covers:

Transfer of terminal data from a network towards a terminal, e.g. downloading terminal equipment software, remotely activating or deactivating terminals.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Protocols for network applications involving the movement of software and/or configuration parameters	H04L 67/34
Cordless phones with means for supporting locally a plurality of applications to increase the functionality provided by software upgrading or downloading	H04M 1/72406

H04W 8/26

Network addressing or numbering for mobility support

Definition statement

This place covers:

Allocating address(es) to network components, services or other logical entities, for the purpose of handling mobility or establishing communication(s) using said address(es);

De-allocating, reclaiming of address(es); Action(s) making use of addresses.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Assignment or use of connection identifiers when establishing a connection	H04W 76/11
Address allocation involving portability aspects in data networks	H04L 61/5084
Additional connecting arrangements for providing access to frequently-wanted subscribers, e.g. abbreviated dialling	H04M 3/44

H04W 8/265**{for initial activation of new user}****Definition statement***This place covers:*

Allocation of network address or number at initial activation of a user

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Access control characterised by a protocol	H04L 63/10
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H04W 8/28**Number portability {; Network address portability}****Definition statement***This place covers:*

Network addressing is carried out independently of a user's subscription data.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Personal communications services for intelligent networking, e.g. provisions for portability of subscriber numbers	H04Q 3/005
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H04W 8/30**Network data restoration; {Network data reliability; Network data fault tolerance}****Definition statement***This place covers:*

Providing for reliability and fault tolerance of network data; Restoring network data after accidental loss or network malfunction.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Arrangements for maintaining operational condition	H04W 24/04
Error control	H04W 28/04
Recovering in data packet switching network from a failure of a protocol instance or entity, e.g. service redundancy protocols, protocol state redundancy or protocol service redirection	H04L 69/40

H04W 12/00

Security arrangements; Authentication; Protecting privacy or anonymity

Definition statement

This place covers:

Security arrangements for wireless communications networks, e.g. wireless sensor networks, self-organizing wireless networks, wireless local loop, and for near field communication networks.

It covers:

- protecting privacy or anonymity
- protecting confidentiality
- key management
- authentication
- access security
- integrity
- fraud detection and prevention
- mobile application security
- using identity modules
- secure pairing of devices
- context-dependent security
- lawful interception

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Security arrangements for protecting computers against unauthorised activity	G06F 21/00
Arrangements for secret or secure communication	H04L 9/00

Special rules of classification

When allocating subgroups [H04W 12/30](#) - [H04W 12/80](#) to patent documents, attention should be made to check whether other subgroups from [H04W 12/02](#) - [H04W 12/12](#) need to be allocated too for a complete classification.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

2G	Second Generation
3G	Third Generation
4G	Fourth Generation
5G	Fifth Generation
ACL	Access Control List
AP	Access Point
API	Application Programming Interface
botnet	Robot Network

Cell ID	Cell IDentity
DoS	Denial of Service
DDoS	Distributed Denial of Service
EAP	Extensible Authentication Protocol
EAP-AKA	Extensible Authentication Protocol-Authentication and Key Agreement
EAP-SIM	Extensible Authentication Protocol-Subscriber Identity Module
EAP-TLS	Extensible Authentication Protocol-Transport Layer Security
eSIM	Embedded Subscriber Identity Module
eSE	Embedded Secure Element
eSSID	Extended Service Set IDentifier
eUICC	Embedded Universal Integrated Circuit Card
GBA	Generic Bootstrapping Architecture
GSM-AKA	Global System for Mobile Communications-Authentication and Key Agreement
ID	IDentity or IDentifier
IEEE 802.1x	Institute of Electrical and Electronics Engineers standard 802.1x.
ICC-ID	Integrated Circuit Card IDentifier
IMEI	International Mobile Equipment Identifier
IMSI	International Mobile Subscriber Identity
ISIM	IMS (IP Multimedia Subsystem) Subscriber Identity Module
LI	Lawful or Legal Interception
M2M	Machine-to-Machine
MCIM	Machine-to-machine Communication Identity Module
MEID	Mobile Equipment IDentifier
MITM	Man-In-The-Middle
MSIN	Mobile Subscriber Identification Number
MSISDN	Mobile Station International Subscriber Directory Number
Multi-SIM	Multiple SIMs
MTM	Mobile Trusted Module
NAS	Non-Access Stratum
NFC	Near Field Communication
OAuth	Open Authorisation
OpenID	Open IDentity
OOB	out of band
OTAR	Over-The-Air Rekeying
P2P	peer-to-peer
PCID	Provisional Connectivity IDentity
PII	Personally Identifiable Information
QR	Quick Response

RBAC	Role Based Access Control
RF	Radio Frequency
RFID	Radio Frequency IDentifier
RRC	Radio Resource Control
RTT	Round Trip Time
RUIM	Removable User Identity Module
SE	Secure Element
SIM	Subscriber Identity Module
SMS	Short Message Service
SSID	Service Set IDentifier
TMSI	Temporary Mobile Station Identity
UICC	Universal Integrated Circuit Card
UMTS-AKA	Universal Mobile Telecommunications System-Authentication and Key Agreement
USB	Universal Serial Bus
USIM	Universal Subscriber Identity Module
WEP	Wired Equivalent Privacy
Wi-Fi®	Wireless Fidelity
WLAN	Wireless Local Area Network
WPA™	Wi-Fi Protected Access®
WPS	Wi-Fi Protected Setup™

H04W 12/009

{specially adapted for networks, e.g. wireless sensor networks, ad-hoc networks, RFID networks or cloud networks}

Definition statement

This place covers:

Security arrangements specially adapted for wireless communications networks specially adapted for networks such as wireless sensor networks, ad-hoc networks, RFID networks or cloud networks.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Self-organising networks	H04W 84/18
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Synonyms and Keywords

In patent documents, the following abbreviations are often used:

RFID	Radio Frequency IDentification
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H04W 12/02

Protecting privacy or anonymity, e.g. protecting personally identifiable information [PII]

Definition statement

This place covers:

Security arrangements specifically adapted for wireless communication networks for protecting privacy and anonymity comprising, for example:

- identity privacy, e.g. aliases, pseudonyms or temporary identities,
- data privacy, e.g. by defining which of the owner's data are visible to other parties, or
- protecting personally identifiable information [PII], e.g. by using privacy policies or levels, by anonymising or obfuscating or blurring user data like location, by hiding browsing or movement history.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Selectively restricting mobility data tracking	H04W 8/16
Security arrangements for protecting computers, components thereof, programs or data against unauthorised activity; Protecting Data	G06F 21/60
Call monitoring; Call tracing; Detection or prevention of malicious calls	H04M 3/2281

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

PII	Personally Identifiable Information
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H04W 12/03

Protecting confidentiality, e.g. by encryption

Definition statement

This place covers:

Security arrangements specifically adapted for wireless communication networks for protecting confidentiality of information, e.g. by encryption or ciphering.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Security arrangements for protecting computers, components thereof, programs or data against unauthorised activity; Protecting Data	G06F 21/60
Arrangements for secret or secure communication, the encryption apparatus using shift registers or memories for blockwise coding	H04L 9/06
Arrangements for secret or secure communication; Public key	H04L 9/30

H04W 12/033**of the user plane, e.g. user's traffic****Definition statement***This place covers:*

Security arrangements specifically adapted for wireless communication networks for protecting confidentiality of user plane, e.g. encrypting user traffic such as SMS, voice, web or application traffic.

Synonyms and Keywords*In patent documents, the following abbreviations are often used:*

SMS	Short Message Service
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H04W 12/037**of the control plane, e.g. signalling traffic****Definition statement***This place covers:*

Security arrangements specifically adapted for wireless communication networks for confidentiality of control plane, i.e. signalling traffic such as NAS, RRC, Over-The-Air Rekey [OTAR] traffic or M2M trigger traffic.

Synonyms and Keywords*In patent documents, the following abbreviations are often used:*

NAS	Non-Access Stratum
RRC	Radio Resource Control
OTAR	Over-The-Air Rekeying
M2M	Machine to Machine

H04W 12/04**Key management, e.g. using generic bootstrapping architecture [GBA]****Definition statement***This place covers:*

Security arrangements specifically adapted for wireless communication networks for key management comprising negotiating, distributing, exchanging, transmitting and validating security keys or credentials.

Typical examples are:

- Key management by Generic Bootstrapping Architecture (GBA),
- EAP-AKA for cellular network,
- EAP-SIM or EAP-TLS for 3GPP-WLAN interworking,
- OpenID or Liberty Alliance and GBA interworking,
- Key agreement via IEEE 802.11x WEP or WPA or WPS push button, e.g. for secure pairing between wireless devices, or

Definition statement

- Key agreement using reduced power transmission like NFC, graphical codes, infrared or audio channels, e.g. for the secure pairing between wireless devices.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Secure pairing between wireless devices	H04W 12/50
Hand-off or reselection arrangements	H04W 36/00
Arrangements for secret or secure communication; Key distribution	H04L 9/08

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

GBA	Generic Bootstrapping Architecture
EAP	Extensible Authentication Protocol
EAP-AKA	Extensible Authentication Protocol-Authentication and Key Agreement
EAP-SIM	Extensible Authentication Protocol-Subscriber Identity Module
EAP-TLS	Extensible Authentication Protocol-Transport Layer Security
3GPP	Third Generation Partnership Project
WEP	Wired Equivalent Privacy
WPA™	Wi-Fi Protected Access®
WPS	Wi-Fi Protected Setup™
NFC	Near Field Communication
IEEE	Institute of Electrical and Electronics Engineers

H04W 12/041

Key generation or derivation

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for key generation or derivation, for example:

- Key derivation for forward and/or backward security for example for securing vertical or horizontal handovers,
- Horizontal key derivation, or
- Vertical key derivations.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Handoff or reselection arrangements	H04W 36/00
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H04W 12/043**using a trusted network node as an anchor****Definition statement**

This place covers:

Key management using a trusted network node as anchor, for example:

- Key agreement for handover via EAP-SIM or EAP-AKA or EAP-TLS for 3GPP-WLAN interworking,
- OpenID and generic bootstrapping architecture [GBA interworking],
- Liberty alliance and GBA interworking.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

GBA	Generic Bootstrapping Architecture
EAP	Extensible Authentication Protocol
EAP-AKA	Extensible Authentication Protocol-Authentication and Key Agreement
EAP-SIM	Extensible Authentication Protocol-Subscriber Identity Module
EAP-TLS	Extended Authenticated Protocol-Transport Layer Security
3GPP	Third Generation Partnership Project
WLAN	Wireless Local Area Network
OpenID	Open Identity

H04W 12/0431**Key distribution or pre-distribution; Key agreement****Definition statement**

This place covers:

Security arrangements specially adapted for wireless communication networks for key distribution using a trusted network node as anchor, e.g. key pre-distribution or key agreement.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Arrangements for secret or secure communication, Key distribution	H04L 9/08
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H04W 12/047**without using a trusted network node as an anchor****Definition statement**

This place covers:

Security arrangements specially adapted for wireless communication networks for key management without using a trusted network node as anchor, for example:

Definition statement

- Key exchange or agreement via Wi-Fi Protected Setup™ [WPS]
- Key exchange using short range communication, e.g. near field communication [NFC],
- Key exchange out-of-band [OOB] methods such as graphical codes, barcodes or Quick Response [QR] codes, infrared, audio waves, light wave, USB dongle, etc. or
- Peer-to-peer [P2P] key exchange or agreement.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

Wi-Fi®	Wireless Fidelity
WPS	Wi-Fi Protected Setup™
OOB	out of band
QR	Quick Response
NFC	near field communication
USB	Universal Serial Bus
P2P	peer-to-peer

H04W 12/06**Authentication****Definition statement**

This place covers:

Security arrangements specially adapted for wireless communication networks for authentication, including authenticating entities such as, e.g. human user(s), device(s), service(s), after consulting network stored entity data or checking their credentials (e.g. GSM-AKA, UMTS-AKA, pre-authentication, continuous authentication, authentication using credential vaults or password managers).

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Security arrangements for protecting computers, components thereof, programs or data against unauthorised activity, Authentication	G06F 21/30
Payment architectures, schemes or protocols, Authorisation	G06Q 20/40
Arrangements for secret or secure communication including means for verifying the identity or authority of a user of the system	H04L 9/32

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

GSM-AKA	Global System for Mobile communications-Authentication and Key Agreement
UMTS-AKA	Universal Mobile Telecommunications System-Authentication and Key Agreement

H04W 12/062

Pre-authentication

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for performing pre-authentication, e.g. pre-caching and verification of credentials for faster login or IEEE 802.1x pre-authentication in advance to connection setup.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

IEEE 802.1x	Institute of Electrical and Electronics Engineers standard 802.1x.
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H04W 12/065

Continuous authentication

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for performing continuous authentication or implicit authentication, i.e. continuous identity recognition and authentication using, e.g. behavioural biometrics and without explicitly asking the user to provide credentials.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Context-dependent security, gesture-dependent or behaviour-dependent	H04W 12/68
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H04W 12/068

{using credential vaults, e.g. password manager applications or one time password [OTP] applications}

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for performing authentication, using credential vaults, or password management applications or OTP applications.

Examples are: generating credentials via device movements or gestures, behaviormetrics for authentication using a learned user behaviour, such as typing or touching or gripping characteristics.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network security architectures or protocols for supporting authentication in a packet data network	H04L 63/08
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Synonyms and Keywords

In patent documents, the following abbreviations are often used:

OTP	One Time Password
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H04W 12/08

Access security

Definition statement

This place covers:

Security arrangements specifically adapted for wireless communications network for access security comprising access authorisation to wireless network resources for example using:

- Authorisation based on an entity's identity, e.g. Access Control Lists ACL, whitelists, blacklists,
- Authorisation based on profile or attributes assigned to an entity, e.g. verifying current profile against expected one, age attribute verification,
- Authorisation based on a group or role, e.g. Role Based Access Control [RBAC],
- Authorisation based security level,
- Authorisation based on the trust score or the reputation of an entity,
- Authorisation based on location, e.g. proximity to other entities, allowed locations,
- Authorisation based on time, e.g. limited time window, within a time range,
- Revocation of authorisation, e.g. secure disconnect, remote kill or suspend or lock or wipe command,
- Delegation of authorisation, e.g. OAuth, user centric management of access rights, user consent or approval,
- Authorisation based on security domains, e.g. controlling access to enterprise security domain or private data security domains, authorisation based on application security domains, e.g. Global Platform domains or authorisation using packet filters or packet firewalls, e.g. SMS Firewalls, NFC or SIM packet filtering.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

ACL	Access Control List
RBAC	Role Based Access Control
SMS	Short Message Service
NFC	Near Field Communication
SIM	Subscriber Identity Module

H04W 12/082**using revocation of authorisation****Definition statement**

This place covers:

Security arrangements specially adapted for wireless communications network comprising access authorisation to wireless network resources using revocation of authorisation, for example:

- Secure disconnect,
- Remote kill command, or
- Remote lock or remote wipe command.

H04W 12/084**using delegated authorisation, e.g. open authorisation [OAuth] protocol****Definition statement**

This place covers:

Security arrangements specially adapted for wireless communications network for access authorisation delegation comprising giving authorisation to wireless network resources without sharing credentials, for example:

- Delegating access or authorisation token, e.g. using OAuth protocol, or
- Distributing authorisation tokens after user's consent or approval.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

OAuth	Open Authorisation
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H04W 12/086**using security domains****Definition statement**

This place covers:

Security arrangements specially adapted for wireless communications network comprising access authorisation to wireless network resources based on security domains, for example:

- Controlling access to enterprise security domain or private security domain,
- Access control based on machine to machine [M2M] security domains, or
- Authorisation based on application security domains (e.g. Global Platform domains).

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

M2M	Machine-to-Machine
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H04W 12/088

using filters or firewalls

Definition statement

This place covers:

Security arrangements specially adapted for wireless communications network comprising access authorisation to wireless network resources using filters or firewalls, for example:

- Wireless packet firewalls,
- SMS firewall,
- NFC packets filters, or
- SIM packets filters.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for monitoring and testing packet switching networks	H04L 43/00
Network architectures or network communication protocols for separating internal from external traffic, e.g. firewalls	H04L 63/02

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

SMS	Short Message Service
NFC	Near Field Communications
SIM	Subscriber Identity Module

H04W 12/10

Integrity

Definition statement

This place covers:

Verifying information received.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Protecting data integrity, e.g. using checksums, certificates or signatures	G06F 21/64
Network security architectures or protocols for verifying the received information	H04L 63/12

H04W 12/102

Route integrity, e.g. using trusted paths

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for verifying or ensuring wireless paths or wireless routes' integrity, e.g. using signatures such as Message Authentication Codes or hash chains.

H04W 12/104

Location integrity, e.g. secure geotagging

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for verifying or ensuring location integrity, e.g. using secure geotagging, trusted wireless cell tagging, or wireless location signatures.

H04W 12/106

Packet or message integrity

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for verifying or ensuring packet integrity, e.g. using packet signatures such as Message Authentication Codes.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Coding, decoding or code conversion, for error detection or error correction; Coding theory basic assumptions; Coding bounds; Error probability evaluation methods; Channel models; Simulation or testing of codes	H03M 13/00
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H04W 12/108

Source integrity

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for verifying or ensuring source (i.e. sender) integrity, e.g. using signatures such as Message Authentication Codes to verify the source (i.e. sender).

H04W 12/12

Detection or prevention of fraud

Definition statement

This place covers:

Security arrangements specifically adapted for wireless communication networks for fraud detection or prevention, comprising

- protecting against rogue devices, e.g. bidding down or downgrading attacks, rogue device or rogue AP or NFC device, selfish nodes,
- wireless intrusion detection and prevention,
- protecting against power exhaustion attacks, e.g. power depletion, starvation attack or sleep deprivation attack,
- anti-theft arrangements, e.g. protection against identity or service or device theft like SIM cloning or machine to machine M2M displacement,
- anti-malware arrangements, e.g. protection against SMS fraud or mobile malware,
- detecting or preventing attacks on wireless networks or entities (e.g. Denial of Service DoS, DDoS, botnet) or
- vulnerability assessment of wireless networks or entities.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Detecting local intrusion or implementing counter-measures	G06F 21/55
Monitoring arrangements; testing arrangements	H04L 43/00

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

AP	Access Point
NFC	Near Field Communications
DoS	Denial of Service
DDoS	Distributed Denial of Service
SMS	Short Message Service
botnet	Robot Network

H04W 12/121

Wireless intrusion detection systems [WIDS]; Wireless intrusion prevention systems [WIPS]

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for wireless intrusion detection and protection, comprising:

- Detecting or preventing intrusions using identifiers in general for example a MAC address, or a Bluetooth® address, or

- Detecting or preventing intrusions using radio fingerprints identifiers.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Context-dependent security, identity-dependent	H04W 12/69
Context-dependent security, radio fingerprint	H04W 12/79

H04W 12/122

Counter-measures against attacks; Protection against rogue devices

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for countermeasures against attacks, e.g. to protect against rogue devices, comprising:

- Protecting against bidding down or downgrading attacks,
- Protecting against rogue WLAN AP or cellular Base Station spoofing legitimate APs or base stations,
- Protecting against wireless short range (e.g. RFID, NFC, Bluetooth®) man-in-the-middle [MITM] or wireless relay attacks,
- Protecting against selfish nodes dropping legitimate packets or impersonating other nodes,
- Isolating malicious wireless devices or malicious wireless traffic, or
- Quarantining malicious wireless devices or dropping malicious wireless traffic.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

WLAN	Wireless Local Area Network
AP	Access Point
NFC	Near Field Communications
RFID	Radio Frequency IDentifier
MITM	Man-in-the-Middle

H04W 12/126

Anti-theft arrangements, e.g. protection against subscriber identity module [SIM] cloning

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks comprising:

- Anti-theft arrangements, e.g. protection against identity or service or device theft like SIM cloning or machine to machine [M2M] displacement,
- Anti-malware arrangements, e.g. protection against SMS fraud or mobile malware,
- Detecting or preventing of attacks on wireless networks or entities, e.g. denial of service [DoS], distributed denial of service [DDoS] or botnet, or

Definition statement

- Vulnerability assessment of wireless networks or entities.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

M2M	Machine-to-Machine
SIM	Subscriber Identity Module

H04W 12/128**Anti-malware arrangements, e.g. protection against SMS fraud or mobile malware****Definition statement**

This place covers:

Security arrangements specially adapted for wireless communication networks comprising anti-malware arrangements, for example:

- Protection against SMS fraud, such as premium SMS malware or
- Protection against mobile malware, e.g. viruses or worms propagating via wireless networks or attacking wireless networks or wireless services.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Computer malware detection or handling, e.g. Anti-Virus arrangements	G06F 21/56
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Synonyms and Keywords

In patent documents, the following abbreviations are often used:

SMS	Short Message Service
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H04W 12/30**Security of mobile devices; Security of mobile applications****Definition statement**

This place covers:

Security arrangements specifically adapted for wireless communications networks for mobile device security or mobile application security, for example:

- Securing mobile application or mobile service provisioning, securing SIM application provisioning,
- Securing mobile application download, protecting update thereof, or
- Managing security policies for mobile applications or mobile devices.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

SIM	Subscriber Identity Module
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H04W 12/33**using wearable devices, e.g. using a smartwatch or smart-glasses****Definition statement***This place covers:*

Security arrangements specially adapted for wireless communications networks for protecting application or service provisioning using wearables, for example:

- Automatic access to entities such as mobile devices, e.g. unlocking mobile devices using wirelessly enabled wearable devices or
- Securing mobile applications or services executable or connectable to using wirelessly enabled wearable devices, such as wireless smartwatches, headphones, bracelets, rings, necklaces, smart-glasses, wristbands.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Identity modules using near field communication	H04W 12/47
Wireless network protocols or protocol adaptations to wireless operations	H04W 80/00

H04W 12/35**{Protecting application or service provisioning, e.g. securing SIM application provisioning}****Definition statement***This place covers:*

Security arrangements specially adapted for wireless communications networks for protecting application or service provisioning, for example:

- Securing SIM application provisioning.
- Securing mobile application download, protecting update thereof.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Power saving arrangements	H04W 52/02
Network security architectures or protocols for detecting or protecting against malicious traffic	H04L 63/14

Synonyms and Keywords*In patent documents, the following abbreviations are often used:*

SIM	Subscriber Identity Module
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H04W 12/37

Managing security policies for mobile devices or for controlling mobile applications

Definition statement

This place covers:

Security arrangements specially adapted for wireless communications networks for managing security policies for mobile applications or mobile devices, for example:

- Managing security policies for mobile applications or devices, using remote mobile device management tools,
- Parents managing child security policies for wireless devices or mobile applications, or
- Employers managing employees' security policies for wireless devices or for mobile applications.

H04W 12/40

Security arrangements using identity modules

Definition statement

This place covers:

Security arrangements specifically adapted for wireless communication networks using identity modules for protecting wireless traffic, comprising

- Using subscriber identity modules SIM, USIM, RUIM, MCIM, ISIM, Secure Element [SE], NFC module, Mobile Trusted Module [MTM],
- Virtual identity modules, e.g. virtual SIMs or downloadable SIMs for running on an embedded Secure Element [eSE] or embedded Universal Integrated Circuit [eUICC] or embedded SIM [eSIM],
- Shared identity modules, e.g. shared SIMs,
- Multiple identity modules, e.g. multi-sim, dual-sim,
- Near field communication [NFC] enabled identity modules for protecting wireless traffic, e.g. NFC tags, smart tag or radio frequency identification [RFID] module, or
- Secure binding of identity modules, e.g. securely binding identity modules to a device or a service or an application like Simlock or subsidy lock, binding an SIM to a Relay Node, binding an App to UICC.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network data management, processing of user or subscriber data	H04W 8/18
Context-dependent security, identity-dependent	H04W 12/69
Payment schemes or models using cards	G06Q 20/34

Special rules of classification

When allocating subgroup [H04W 12/40](#), attention should be made to check whether other subgroups, e.g. [H04W 12/06](#) (using SIM for authentication) or [H04W 12/08](#) (using SIM for access security) need to be allocated too for a complete classification.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

SIM	Subscriber Identity Module
USIM	Universal Subscriber Identity Module
RUIM	Removable User Identity Module
MCIM	Machine-to-machine Communication Identity Module
ISIM	IMS (IP Multimedia Subsystem) Subscriber Identity Module
UICC	Universal Integrated Circuit Card
SE	Secure Element
eSIM	Embedded Subscriber Identity Module
eUICC	Embedded Universal Integrated Circuit Card
eSE	Embedded Secure Element
MTM	Mobile Trusted Module
NFC	Near Field Communication
RFID	Radio Frequency IDentification

H04W 12/42

using virtual identity modules

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks using virtual identity modules for protecting wireless traffic, comprising

- Virtual SIMs or downloadable SIMs for running on an embedded Secure Element [eSE] or embedded Universal Integrated Circuit [eUICC] or embedded SIM [eSIM].

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network data management, processing of user or subscriber data	H04W 8/18
Payment schemes or models using cards	G06Q 20/34

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

SIM	Subscriber Identity Module
eSIM	Embedded Subscriber Identity Module
eUICC	Embedded Universal Integrated Circuit Card
eSE	Embedded Secure Element

H04W 12/43**using shared identity modules, e.g. SIM sharing****Definition statement**

This place covers:

Security arrangements specially adapted for wireless communication networks using shared identity modules, e.g. SIM sharing between tethered devices and between a SIMless devices and device equipment with a SIM or UICC.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

SIM	Subscriber Identity Module
UICC	Universal Integrated Circuit Card

H04W 12/45**using multiple identity modules****Definition statement**

This place covers:

Security arrangements specially adapted for wireless communication networks using multiple identity modules for protecting wireless traffic, e.g. multi-sim, dual-sim.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

SIM	Subscriber Identity Module
Multi-SIM	Multiple SIMs

H04W 12/47**using near field communication [NFC] or radio frequency identification [RFID] modules****Definition statement**

This place covers:

Security arrangements specially adapted for wireless communication networks using near field communication [NFC] enabled identity modules for protecting wireless traffic, e.g. NFC tags, smart tag or radio frequency identification [RFID] module, or NFC enabled SIM or UICC cards.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

NFC	Near Field Communication
RFID	Radio Frequency IDentification
SIM	Subscriber Identity Module

H04W 12/48

using secure binding, e.g. securely binding identity modules to devices, services or applications

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks for the secure binding of identity modules, e.g. securely binding identity modules to a device or a service or an application like Simlock or subsidy lock, binding an SIM to a Relay Node, and binding an App to UICC.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Network data management for processing of user or subscriber data	H04W 8/18
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Synonyms and Keywords

In patent documents, the following abbreviations are often used:

SIM	Subscriber Identity Module
UICC	Universal Integrated Circuit Card

H04W 12/50

Secure pairing of devices

Definition statement

This place covers:

Security arrangements specifically adapted for wireless communication networks for securing pairing of wireless devices, for example:

- Bootstrapping a secure communication link between pairing terminals or
- Secure socializing by establishing a secure wireless link between terminals and their respective mobile social network applications, for examples between mobile terminals of friends, family members, guests.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Affiliation to network using triggered events	H04W 60/04
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H04W 12/55**involving three or more devices, e.g. group pairing****Definition statement***This place covers:*

Security arrangements specially adapted for wireless communications networks for securing pairing of wireless devices involving three or more devices, e.g. group pairing, securely joining wireless ad-hoc networks.

H04W 12/61**Time-dependent****Definition statement***This place covers:*

Time-dependent security arrangements specially adapted for wireless communication networks, e.g. using timestamps, time delays like Round Trip Time RTT or time windows.

Synonyms and Keywords*In patent documents, the following abbreviations are often used:*

RTT	Round Trip Time
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H04W 12/63**Location-dependent; Proximity-dependent****Definition statement***This place covers:*

Location-dependent or proximity-dependent security arrangements specially adapted for wireless communication networks, e.g. using absolute location or proximity to other devices measured using received signal strength RSS.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Services making use of location information	H04W 4/02
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H04W 12/64**using geofenced areas****Definition statement***This place covers:*

Geofenced location aware security arrangements specially adapted for wireless communication networks, e.g. using fenced areas.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Services making use of location information, services related to particular areas	H04W 4/02
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H04W 12/65

Environment-dependent, e.g. using captured environmental data

Definition statement

This place covers:

Environment-dependent security arrangements specially adapted for wireless communication networks, e.g. using captured environmental data like audio, image, media or temperature.

H04W 12/67

Risk-dependent, e.g. selecting a security level depending on risk profiles

Definition statement

This place covers:

Risk-dependent security arrangements specially adapted for wireless communication networks, e.g. arrangements based on risk profiles, risk scores or trust scores derived from social networks (e.g. from mobile friends or buddy lists), or arrangements based on trust scores determined by trusted third party servers.

H04W 12/68

Gesture-dependent or behaviour-dependent

Definition statement

This place covers:

Gesture-dependent or behaviour-dependent security arrangements specially adapted for wireless communication networks, e.g. using gestures or device movement.

Examples are: generating credentials via device movements or gestures, behaviormetrics for authentication using a learned user behaviour, such as typing or touching or gripping characteristics.

H04W 12/71

Hardware identity

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks using wireless hardware identities, e.g. IMEI, MEID, ICC-ID.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

IMEI	International Mobile Equipment Identifier
MEID	Mobile Equipment Identifier
ICC-ID	Integrated Circuit Card Identifier

H04W 12/72

Subscriber identity

Definition statement

This place covers:

Security arrangements specifically adapted for wireless communication networks using wireless subscriber identities, e.g. MSISDN, IMSI or MSIN.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

MSISDN	Mobile Station International Subscriber Directory Number
IMSI	International Mobile Subscriber Identity
MSIN	Mobile Subscriber Identification Number

H04W 12/73

Access point logical identity

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks using wireless access point logical identities, e.g. AP SSID, ESSID or Base station Cell ID.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

AP	Access Point
SSID	Service Set Identifier
eSSID	Extended Service Set Identifier
Cell ID	Cell Identity

H04W 12/75

Temporary identity

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks using temporary identities, e.g. TMSI, PCID, pseudonym or alias, random or one-time ID, rolling ID, session ID or anonymous ID.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

TMSI	Temporary Mobile Station Identity
PCID	Provisional Connectivity IDentity
ID	IDentity or IDentifier

H04W 12/76

Group identity

Definition statement

This place covers:

Security arrangements specifically adapted for wireless communication networks using group identities, e.g. group ID, group IMSI, shared identity, pool of identities.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network data management, mobility data transfer	H04W 8/08
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Synonyms and Keywords

In patent documents, the following abbreviations are often used:

IMSI	International Mobile Station Identity
ID	IDentity or IDentifier

H04W 12/77

Graphical identity

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks using graphical identities, e.g. graphical codes, barcodes or QR codes.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

QR	Quick Response
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H04W 12/79

Radio fingerprint

Definition statement

This place covers:

Security arrangements specially adapted for wireless communication networks using radio fingerprints, e.g. electromagnetic signature or RF fingerprint.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

RF	Radio Frequency
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H04W 12/80

Arrangements enabling lawful interception [LI]

Definition statement

This place covers:

Security arrangements specially adapted for wireless communications networks for lawful or legal interception.

Note: This group should only be allocated when the technical aspects relate to security arrangements for wireless networks for managing "lawful interception"

Special rules of classification

When allocating subgroup [H04W 12/80](#) to documents, attention should be made to check whether other subgroups from [H04W 12/02](#) - [H04W 12/128](#) need to be allocated too for a complete classification.

H04W 16/00

Network planning, e.g. coverage or traffic planning tools; Network deployment, e.g. resource partitioning or cells structures

Definition statement

This place covers:

- Arrangements and techniques for determining traffic capacity for network equipments and/or linking infrastructure.
- Distribution of spectral resources at deployment stage, i.e. distributing wireless channels to access points; Re-distribution of said resources during operation on basis of predicted or predefined traffic patterns.
- Providing wireless coverage by special arrangements of service areas or shape, e.g. cell structures.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network traffic or resource management	H04W 28/00
Local resource management	H04W 72/00

H04W 16/02

Resource partitioning among network components, e.g. reuse partitioning

Definition statement

This place covers:

- Distribution, at initial stage of deployment, of spectral resources, e.g. channels among access points in a network.
- Defining spectral resources to be re-distributed.
- Sizing network equipments or network equipment links for the purpose of handling expected traffic.
- Distribution of pilot channels

H04W 16/04

Traffic adaptive resource partitioning

Definition statement

This place covers:

Part of the spectral resources can be re-distributed to the access points in order to autonomously optimize performance using long or short term variations in traffic, i.e. the network does not revert to the original distribution.

H04W 16/06

Hybrid resource partitioning, e.g. channel borrowing

Definition statement

This place covers:

Part of the spectral resources distributed to an access point can be relinquished to adjacent access points to avoid communication drops or regulate traffic load. When not longer needed, the relinquished resources are returned to the original access point.

H04W 16/08

Load shedding arrangements

Definition statement

This place covers:

The expected traffic load is regulated by controlling the size of a service area by controlling the transmission power of an access point.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Hand-off or reselecting arrangements for handling the traffic	H04W 36/22
Transmission power control management, i.e. sharing limited amount of power among users or channels or data types, taking into account loading or congestion level	H04W 52/343

H04W 16/10

Dynamic resource partitioning

Definition statement

This place covers:

- Partitioning of all spectral resources is performed autonomously among the access points normally on a interference limiting criteria.
- Dynamic channel partitioning as such.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Wireless resource selection or allocation	H04W 72/04
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H04W 16/12

Fixed resource partitioning

Definition statement

This place covers:

All of the available spectral resources are assigned in a fixed manner among the network's access points.

Cluster reuse wherein one or more reuse patterns are assigned to at least one access point.

H04W 16/14

Spectrum sharing arrangements {between different networks}

Definition statement

This place covers:

Service area(s) belonging to different wireless networks have at least one of their allocated or cooperatively used spectral resources in common.

Techniques and arrangements for avoiding simultaneous use of the resource, e.g. for detecting interference-free channels in overlap areas.

Covers overlap sharing, i.e. filling voids or gaps in used or allocated resources. Covers also underlay sharing, i.e. using the resources of an overlaid system in an underlying system while staying within

Definition statement

an agreed noise floor. Covers the detection and cooperative use of licensed spectrum resources or their detection for interference free operation of unlicensed networks.

Covers also spectrum sharing aspects of cognitive radio systems.

Interference avoidance for communication to/from terminal.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Wireless resource selection or allocation	H04W 72/04
Dynamic wireless traffic scheduling; Dynamically scheduled allocation on shared channel	H04W 72/12
Allocation of wireless resources based on quality criteria	H04W 72/54
Auxiliary means for detecting or identifying radar signals or the like	G01S 7/021
Assessment of spectral gaps suitable for allocating digitally modulated signals in multi-carrier systems, e.g. for carrier allocation in cognitive radio	H04L 27/0006

H04W 16/16

for PBS [Private Base Station] arrangements

Definition statement

This place covers:

One of the networks being of small scale for non-public usage.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Public Land Mobile Systems, e.g. cellular systems, using private Base Stations, e.g. femto Base Stations, home Node B	H04W 84/045
Small scale networks, flat hierarchical networks, PBS [Private Base Station] network	H04W 84/105

H04W 16/18

Network planning tools

Definition statement

This place covers:

- Coverage prediction tools or models.
- Use of field measurements for network deployment, use of test access points for determining optimal or optimized locations for network deployment.
- Arrangements and techniques for providing initial network coverage at network deployment or additional coverage at subsequent re-deployment stage. This additional coverage at subsequent re-deployment stage refers to a planned system upgrade, i.e. is not an adaptation of a running system.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Measuring electromagnetic field characteristics	G01R 29/08
Arrangements for maintenance or administration of data switching networks, hardware and software tools for network design, e.g. with integrated simulation and design testing	H04L 41/145

H04W 16/22

Traffic simulation tools or models

Definition statement

This place covers:

Arrangements and techniques for predicting equipment or system link capacity or system performance

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for maintenance or administration of data switching networks, hardware and software tools for network design, e.g. with integrated simulation and design testing	H04L 41/145
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H04W 16/24

Cell structures

Definition statement

This place covers:

Arrangements where wireless coverage is provided by special arrangements of service areas (cells) or shape thereof.

H04W 16/26

Cell enhancers {or enhancement}, e.g. for tunnels, building shadow

Definition statement

This place covers:

Techniques and arrangements where the service area is extended by dedicated repeating equipment, Network coordinated processing for cell enhancements. This subgroup contains the use of repeaters to extend the coverage, i.e. the repeater is essentially at fixed position and under direct control of the wireless network.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Public Land Mobile Systems using dedicated repeater stations	H04W 84/047
Terminal device adapted for relaying to or from another terminal or user	H04W 88/04
Active relay systems	H04B 7/15
Radio transmission arrangements for base station coverage control, e.g. by using relays in tunnels	H04B 7/2606

H04W 16/28

using beam steering

Definition statement

This place covers:

The service area is defined by a focused beam in a desired generally variable direction of transmission or reception, e.g. electric antenna tilting or beam forming.

References

Limiting references

This place does not cover:

Arrangements for changing or varying the orientation or the shape of the directional pattern of the waves radiated from an aerial or aerial system	H01Q 3/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Control of transmission	H04B 7/005
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H04W 16/30

Special cell shapes, e.g. doughnuts or ring cells

Definition statement

This place covers:

The service area differs substantially from a normally polygonal or sectorized shape, e.g. the outer borders of the ring are defined by preset values of an access point's transmission power.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Load shedding arrangements	H04W 16/08
Transmission power control management, i.e. sharing limited amount of power among users or channels or data types, taking into account loading or congestion level	H04W 52/343

H04W 16/32

Hierarchical cell structures

Definition statement

This place covers:

Partitioning spectral resources among access areas organized into ranks, each subordinate to the one above it. Macro cell, microcell overlays.

H04W 24/00

Supervisory, monitoring or testing arrangements

Definition statement

This place covers:

- Arrangements for supervising performance of a deployed network.
- Testing or monitoring arrangements specially adapted for wireless networks.
- Arrangements for evaluating network performance under real or simulated traffic conditions.
- System equipment reconfiguration or upgrades in order to improve overall network performance.

This group relates also to testing of network components and the monitoring of connections for performance assessment.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Monitoring; testing	H04B 17/00
Arrangements for maintenance or administration of data switching networks	H04L 41/00
Details of data switching networks, monitoring arrangements, testing arrangement	H04L 41/06
Network Service management	H04L 41/50
Supervisory, monitoring or testing arrangements for automatic or semiautomatic exchanges	H04M 3/22

H04W 24/02

Arrangements for optimising operational condition

Definition statement

This place covers:

Automatic configuration of system equipment, reconfiguration or upgrades in order to improve overall network performance. The permanent deployment of additional, i.e. not initially planned, equipment or resources for performance improvement.

Generation, update or management of Neighbour Cell Lists for network management

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network planning tools	H04W 16/18
Determination of parameters used for hand-off e.g. generation or modification of neighbour cell lists	H04W 36/0083
Service support, Network management device	H04W 88/18
Configuration optimization of network or network elements in data switching networks	H04L 41/0823

H04W 24/04

Arrangements for maintaining operational condition

Definition statement

This place covers:

Reliability aspects, stand-by arrangements, back-up or redundant systems or system components in a network.

References

Limiting references

This place does not cover:

Details of transmission systems for increasing reliability, e.g. using redundant or spare channels or apparatus	H04B 1/74
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Network data restoration	H04W 8/30
Details of data switching networks, arrangements for maintenance or administration involving automatic restoration of network faults	H04L 41/0654

H04W 24/06

Testing, {supervising or monitoring} using simulated traffic

Definition statement

This place covers:

The operational condition of the network or network nodes is assessed using data generated outside normal operation or by self-testing operation, e.g. loop-back operation.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Hardware and software tools for network design, e.g. with integrated simulation and design testing in data switching networks	H04L 41/145
Monitoring arrangements for data switching networks	H04L 43/00

H04W 24/08

Testing, {supervising or monitoring} using real traffic

Definition statement

This place covers:

The operational condition of the network or network nodes is assessed with data collected during normal operation.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network Planning tools	H04W 16/18
Hardware and software tools for network design, e.g. with integrated simulation and design testing in data switching networks	H04L 41/145
Monitoring arrangements for data switching networks	H04L 43/00

H04W 24/10

Scheduling measurement reports {; Arrangements for measurement reports}

Definition statement

This place covers:

Generating measurement requests to monitoring equipment; measuring/collecting/receiving data at/ from reporting equipment.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Discovery of network devices, e.g. terminals	H04W 8/005
Generation, update or management of Neighbour Cell Lists for network management	H04W 24/02
Hand-off or reselecting arrangements	H04W 36/00
Generation, update or management of Neighbour Cell Lists for the purpose of hand-off	H04W 36/0083
Determination of parameters used for hand-off, scheduling hand-off measurements	H04W 36/0088

Connectivity information management, e.g. connectivity discovery or update	H04W 40/24
Power headroom reporting	H04W 52/365
Wireless resource selection or allocation based on quality criteria	H04W 72/54
Processing of captured monitoring data, report generation in data switching networks	H04L 43/06

H04W 28/00

Network traffic management; Network resource management

Definition statement

This place covers:

Arrangements or techniques for central control, by a network component, of traffic or admission policies for the purpose of, e.g. ensuring fair use of network resources among users or terminals or guarantying implicit or negotiated service level or quality agreements. Management of negotiated local resources for further allocation.

This group together with its subgroups cover all reservation and resource negotiation activities (both central and local).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Local resource management, e.g. wireless traffic scheduling or selection or allocation of wireless resources	H04W 72/00
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H04W 28/02

Traffic management, e.g. flow control or congestion control

Definition statement

This place covers:

Avoiding or regulating an actual or potential traffic overload condition

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Flow control in the network	H04W 28/10
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H04W 28/04**Error control****Definition statement**

This place covers:

Arrangements for preventing, detecting, or correcting errors in the information received in wireless networks.

Relationships with other classification places

Arrangements for detecting or preventing errors in the information received in general, i.e. including in wireless networks, is classified in [H04L 1/00](#).

H04W 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](#))}

Definition statement

This place covers:

Techniques or arrangements whereby the amount of information transmitted over a wireless link is optimized by:

- Reducing the amount of associated control information.
- Performing information sizing across a wireless interface, e.g. adapting the length of a packet to carry one or more information blocks without bit stuffing.
- Discarding information.

References**Limiting references**

This place does not cover:

Systems modifying transmission characteristic according to link quality by modifying the frame length	H04L 1/0007
Dynamic adaptation of the packet size for flow control or congestion control	H04L 47/365

Informative references

Attention is drawn to the following places, which may be of interest for search:

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	H04W 4/18
Compression; Expansion; Suppression of unnecessary data, e.g. redundancy reduction	H03M 7/30
Systems modifying transmission characteristics according to link quality by adapting the source coding	H04L 1/0014

Protocols for data compression not specifically aiming the wireless interface	H04L 69/04
High level architectural aspects of 7-layer open systems interconnection [OSI] type protocol stacks	H04L 69/32

H04W 28/065

{using assembly or disassembly of packets}

Definition statement

This place covers:

Adaptation of traffic data packets received from higher layers onto packet transmission requirements of lower layer, e.g. SDU onto PDU, by fragmentation or aggregation.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Queuing arrangements for supporting packet reassembly or resequencing	H04L 49/9057
High level architectural aspects of 7-layer open systems interconnection [OSI] type protocol stack	H04L 69/32

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "fragmentation", and "segmentation"
- "aggregation", and "concatenation"

H04W 28/08

Load balancing or load distribution (transferring a connection for handling the traffic [H04W 36/22](#); wireless traffic scheduling [H04W 72/12](#))

Definition statement

This place covers:

Techniques and arrangements where communication information is transmitted over alternate transmission paths for balancing the load in the system or when a preferred or desired path is unavailable due to excessive traffic carried over said path, e.g. load shedding/sharing involving alternative entities.

Emphasis is put on "alternate" here to distinguish from flow control; e.g. load shedding/sharing involving alternative entities will be covered here.

Typical example: different paths in the backbone network.

References

Limiting references

This place does not cover:

Transferring a connection for handling the traffic	H04W 36/22
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Wireless traffic scheduling	H04W 72/12
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Hand off or reselecting arrangements for handling the traffic	H04W 36/22
Communication route or path selection based on wireless node resources	H04W 40/04
Access restriction based on traffic conditions	H04W 48/06
Load balancing in packet switching networks	H04L 47/125

H04W 28/082

among bearers or channels

Definition statement

This place covers:

Load balancing or load distribution among channels or bearers, such as based on channel or bearer status.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reselecting a communication resource in the serving access point	H04W 36/06
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H04W 28/084

among network function virtualisation [NFV] entities; among edge computing entities, e.g. multi-access edge computing

Definition statement

This place covers:

Load balancing or load distribution among network function virtualisation [NFV] or edge computing entities, such as based on status of network function virtualization [NFV] or edge computing entities, such as multi-access edge computing, etc.

H04W 28/086

among access entities

Definition statement

This place covers:

Load balancing or load distribution among access entities, such as based on access entities status.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reselecting an access point	H04W 36/08
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H04W 28/088

among core entities

Definition statement

This place covers:

Load balancing or load distribution among core entities, such as based on core entities status.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reselecting a serving backbone network switching or routing node	H04W 36/12
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H04W 28/10

Flow control {between communication endpoints}

Definition statement

This place covers:

Techniques and arrangements to regulate the amount of communication information in the network.

In this subgroup flow control is seen from a network point of view, i.e. involving backbone network entities which can communicate to perform flow control. This covers up and downlink.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Local resource management with wireless traffic scheduling	H04W 72/12
Flow control in packet switching networks	H04L 47/10

H04W 28/12

using signalling between network elements

Definition statement

This place covers:

Supervisory or control information is exchanged between equipments involved in information transmission.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Flow Control and congestion control in packet switching networks using signalling	H04L 47/26 , H04L 47/33
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H04W 28/14

using intermediate storage

Definition statement

This place covers:

The information is temporarily stored, buffered, queued for transmission.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Buffering or recovering information during reselection	H04W 36/02
Schedule definition, set-up, creation based on age of data to be sent	H04W 72/1221
Flow Control and congestion control in packet switching networks using information about buffer occupancy at either end or transit nodes	H04L 47/30

H04W 28/16

Central resource management; Negotiation of resources or communication parameters, e.g. negotiating bandwidth or QoS [Quality of Service]

Definition statement

This place covers:

- Central management of wireless communication resources, i.e. management of wireless communication resources in the access network, e.g. between a central communication resource manager and an access point
- (Re)Negotiating communication parameters of connections involving at least one wireless communication link over which information is to be delivered with a requesting user/terminal from within or outside the system.
- Grant or denial of requests from new users/terminals via access points and conditions under which such requests are granted in view of keeping respectively meeting negotiated or implicit requirements for serviced users or terminals. Establishment of communication parameters through actions other than negotiation (e.g. delegating or commanding the use of pre-established parameters; determining by a device itself the set of parameters to use).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Services or facilities specially adapted for wireless communication networks	H04W 4/00
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Security arrangements, e.g. access security or fraud detection, Authentication, e.g. verifying user identity or authorisation, Protecting privacy or anonymity	H04W 12/00
Local resource management	H04W 72/00
Admission Control and Resource allocation in packet switching networks	H04L 47/70

H04W 28/18

Negotiating wireless communication parameters

Definition statement

This place covers:

Determining the wireless resources or parameters to be used to achieve an agreed SLA, QoS, etc.

The resources can be provided by/in different networks.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for detecting or preventing errors in the information received, modifying transmission characteristics according to link quality	H04L 1/0001
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H04W 28/20

Negotiating bandwidth

Definition statement

This place covers:

(Re)negotiating bandwidth of connection(s) via one or more communication links.

The negotiated bandwidth may be provided via one or more communication links.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of data switching networks, arrangements for maintenance or administration, involving configuration of the network and network elements, bandwidth and capacity management, i.e. automatically increasing or decreasing capacities, e.g. bandwidth on demand	H04L 41/0896
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Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Bandwidth	transmission capacity available for communication as provided by a suitable combination of communication links of predefined capacity
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H04W 28/22**Negotiating communication rate****Definition statement**

This place covers:

(Re)negotiating transmission rate of connection.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Communication rate	information rate available for communication provided by a suitable combination of information coding and/or modulation techniques
--------------------	--

H04W 28/24**Negotiating SLA [Service Level Agreement]; Negotiating QoS [Quality of Service]****Definition statement**

This place covers:

Determining or negotiating the SLA or QoS. Allowing temporary "graceful degradation" in order to maximize general network capacity.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Data switching networks, stored and forward switching systems, packet switching systems, flow control, access or admission control, e.g. network resource reservation	H04L 47/18
Selecting arrangements, arrangements providing connection between exchanges, provisions for network management, bandwidth allocation or management	H04Q 3/0066

H04W 28/26**Resource reservation****Definition statement**

This place covers:

- Reservation of resources in backbone network; reservation of wireless resources to be allocated by local controller.
- Reservation based on predicted user or terminal behaviour, e.g. moving direction or speed.

Resources are reserved not for immediate but for future use.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Wireless resource selection or allocation	H04W 72/04
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H04W 36/00

Hand-off or reselection arrangements

Definition statement

This place covers:

Transferring ongoing connection(s) of a user or terminal in connected state to different network resource(s) or administrative domains with the purpose of avoiding or limiting loss or degradation of said connection(s) due to user mobility, wireless link conditions or system loading.

The reselection can take place at the user and/or system initiative based on fixed or agreed criteria and can be performed for all or part of the assigned resources.

Generation, update or management of Neighbour Cell Lists; temporary storage, buffering of connection data during reselection, performing registration, binding or location updates at reselection of network equipment or administrative domains.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Supervisory, monitoring or testing arrangements	H04W 24/00
"Idle hand-off", i.e. reselection while user terminal is in an idle, non-connected state	H04W 48/18 , H04W 48/20
Transmission Power Control during macro-diversity or soft handoff	H04W 52/40
Registration, e.g. affiliation to network; De-registration, e.g. terminating affiliation	H04W 60/00
Resource management for broadcast services	H04W 72/30
Connection management	H04W 76/00
Arrangements for detecting or preventing errors in the information received	H04L 1/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

hand-off	means a change of a radio link while a connection is ongoing (active state) or readily set up although no data are currently transmitted (dormant state)
user mobility	means the user changing his point(s) of attachment in the network(s), e.g. access point due to movement in service areas
registration	means using system, user or terminal tracking information to detect user mobility

seamless	means a reselection whereby wireless links are temporarily added or deleted in such a manner that the terminal keeps at least one link connected
lossless reselection	means a reselection whereby information loss during reselection is prevented or avoided

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- handover and hand-off

H04W 36/0005

{Control or signalling for completing the hand-off}

Definition statement

This place covers:

Exchange of information for controlling the realisation of the hand-off

H04W 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](#))}

Definition statement

This place covers:

Transmission and use of control information, e.g. hand-off signalling messages, including trigger messages which initiates connection(s) hand-off of MBMS services provided in the cell.

References

Limiting references

This place does not cover:

Selective distribution or broadcast services to user groups	H04W 4/06
Resource management for broadcast services	H04W 72/30
Connection management for selective distribution or broadcast	H04W 76/40

H04W 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](#))}

Definition statement

This place covers:

Transmission and use of control information, e.g. hand-off signalling messages, including trigger messages which initiates connection(s) hand-off of group communication(s), e.g. for moving wireless networks or hand-off of a group of terminals.

References**Limiting references**

This place does not cover:

User group management	H04W 4/08
Processing of subscriber group data	H04W 8/186

Informative references

Attention is drawn to the following places, which may be of interest for search:

Hand-off for a plurality of connections of one user	H04W 36/28
Network topology specific to moving wireless networks	H04W 84/005

H04W 36/0011

{for data sessions of end-to-end connection}

Definition statement

This place covers:

Transmission and use of control information, e.g. hand-off signalling messages, including trigger messages which initiate data session or connection hand-off.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Connection manipulation of transport tunnels	H04W 76/22
Real-time multimedia communications; Session management	H04L 65/1066

H04W 36/0016**{Hand-off preparation specially adapted for end-to-end data sessions}****Definition statement***This place covers:*

Preparing data session for end-to-end connection hand-off (e.g. by using binding update messages) carried out during or prior to lower layer hand-off events (e.g. radio link hand-off), e.g. for mobile IP, GPRS tunnelling protocol [GTP].

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Resource reservation	H04W 28/26
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H04W 36/0019**{adapted for mobile IP [MIP]}****Definition statement***This place covers:*

Handover signalling adapted for mobile IP.

H04W 36/0022**{for transferring data sessions between adjacent core network technologies}****Definition statement***This place covers:*

Facilitating access network mobility of data sessions through handovers between at least two core network domains, either in one or in both directions. Involves change from one core network technology, e.g. from packet switched [PS], to a different core network technology, to e.g. circuit switched [CS] domain or to CS fall-back in evolved packet system [EPS].

Used, e.g. in voice call continuity [VCC], single radio VCC [SRVCC] or voice over LTE generic access [VoLGA].

H04W 36/00222**{between different packet switched [PS] network technologies, e.g. transferring data sessions between LTE and WLAN or LTE and 5G}****Definition statement***This place covers:*

Facilitating access network mobility of data sessions through handovers between at least two adjacent core network domains belonging to different packet switched network technologies, e.g. between LTE and WLAN or LTE and 5G.

H04W 36/00224

{between packet switched [PS] and circuit switched [CS] network technologies, e.g. circuit switched fallback [CSFB]}

Definition statement

This place covers:

Facilitating access network mobility of data sessions through handovers between at least two adjacent core network domains belonging to one packet switched network technology and one circuit switched network technology, e.g. CSFB.

H04W 36/00226

{wherein the core network technologies comprise IP multimedia system [IMS], e.g. single radio voice call continuity [SRVCC]}

Definition statement

This place covers:

Facilitating access network mobility of data sessions through handovers between at least two adjacent core network domains belonging to one packet switched network technology and one circuit switched network technology, wherein at least one core network domain comprises IP multimedia core network subsystem [IMS], e.g. SRVCC.

H04W 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}

Definition statement

This place covers:

Exchange of information for selecting a particular data session to be handed off.

H04W 36/0033

{with transfer of context information}

Definition statement

This place covers:

Existing context information e.g. PDP context is provided to the hand-off target, e.g., using hand-off signalling between source and target node

H04W 36/0038

{of security context information}

Definition statement

This place covers:

Transparent transfer of whole security contexts or parts of a security context, e.g., using hand-off signalling between source and destination node. Solely the transport but not the particular content of the context information is essential. For earlier or in-time availability of established security contexts in connection with hand-offs.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Security arrangements; authentication; protecting privacy or anonymity	H04W 12/00
Arrangements for Network Security characterised by a protocol	H04L 63/00

Special rules of classification

The use of [H04W 12/04](#) code for additional information is mandatory.

H04W 36/0044

{of quality context information}

Definition statement

This place covers:

Transparent transfer of data session or connection quality contexts or parameters, e.g. using hand-off signalling between source and target node. Solely the transport but not the particular content of the context information is essential. For earlier or in-time availability of established quality contexts in connection with hand-offs.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Central resource management; Negotiation of resources, e.g. negotiating bandwidth or QoS [Quality of Service]	H04W 28/16
Flow control in packet switching systems	H04L 47/10

H04W 36/005

{involving radio access media independent information, e.g. MIH [Media independent Hand-off]}

Definition statement

This place covers:

Radio network independent, universal signalling methods are used to control hand-off in different radio networks, e.g., IEEE 802.21 Media Independent Handoff

H04W 36/0055

{Transmission or use of information for re-establishing the radio link}

Definition statement

This place covers:

Transmission and use of capacity information of neighbouring cells; Transmission and use of configuration information to be applied in the target cell; Transmission and use of information to assist the MT to retrieve neighbour cell information;

Transmission and use of the configuration information of the links associated with the terminal realising the hand-off; Transmission and use of specific resource information which are used to transmit a handover message.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Load balancing or load distribution	H04W 28/08
Central resource management, Negotiation of resources, e.g. negotiating bandwidth or QoS [Quality of Service]	H04W 28/16
Access restriction or access information delivery, e.g. discovery data delivery	H04W 48/08
Control information exchange between nodes	H04W 72/20

H04W 36/0058

{Transmission of hand-off measurement information, e.g. measurement reports}

Definition statement

This place covers:

Transmission of measurement information and their usage for re-establishing the radio link, e.g. handoff signalling messages.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Hand-off measurements	H04W 36/0085
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H04W 36/0061

{of neighbour cell information}

Definition statement

This place covers:

Transmission and use of cell information, e.g. cell ID, neighbour cell lists or service capabilities.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Determination, generation or modification of neighbour cell list(s)	H04W 36/00835
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H04W 36/0064**{of control information between different access points}****Definition statement***This place covers:*

Direct transfer of handover control information between different access points, e.g. between source and target access point.

H04W 36/0066**{of control information between different types of networks in order to establish a new radio link in the target network}****Definition statement***This place covers:*

Transmission of information between different types of networks in order to establish a new radio link.

H04W 36/0069**{in case of dual connectivity, e.g. decoupled uplink/downlink}****Definition statement***This place covers:*

Transmission and use of information for hand-off of radio link(s) in case of RRC diversity, decoupled uplink/downlink, aggregation of macro anchor carrier and low power node data booster, CoMP, carrier aggregation, unbalanced uplink/downlink.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Allocation of physical resources in a cooperative multipoint environment	H04L 5/0035
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H04W 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](#))}****Definition statement***This place covers:*

Handover involving connections transmitting multiple data streams in parallel, e.g. using cooperative multipoint environment [CoMP], carrier aggregation [CA] or using multiple transmitting/receiving antennas [MIMO].

H04W 36/00695**{using split of the control plane or user plane}****Definition statement***This place covers:*

Handover of only one of the control plane or user plane connections in environments using multiple user plane connections.

H04W 36/00698**{using different RATs}****Definition statement***This place covers:*

Handover in case of dual connection using different radio access technologies, e.g. licensed/unlicensed or LTE/5G.

H04W 36/0072**{of resource information of target access point}****Definition statement***This place covers:*

Notifying the terminal about resources assigned to the target access point or to be used by the terminal; Notification of timing information of a target cell.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Compensating for timing error of reception due to propagation delay by altering transmission time	H04W 56/0045
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H04W 36/00725**{Random access channel [RACH]-less handover}****Definition statement***This place covers:*

Execution of handoff without execution of a RACH procedure when accessing the target cell.

H04W 36/0077**{of access information of target access point}****Definition statement***This place covers:*

Transmission of random access codes to be used for accessing the destination cell; Transmission of ranging codes.

H04W 36/0079**{in case of hand-off failure or rejection}****Definition statement***This place covers:*

Transmission and use of information for retry strategies in case of hand-off failure or rejection.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Management of connection set-up rejection and failure	H04W 76/18
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H04W 36/0083**{Determination of parameters used for hand-off, e.g. generation or modification of neighbour cell lists}****Definition statement***This place covers:*

Scanning for hand-off; generation of neighbour cell lists; determination of threshold for signal level reception upon which reporting should be done or upon which hand-off is triggered; update of neighbouring cell list; Determination of the resource that shall be used in the neighbouring cell; Provision of measurements reports in connection with hand-off.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Discovering; Processing access restriction or access information	H04W 48/16
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H04W 36/00833**{Handover statistics}****Definition statement***This place covers:*

Determination of handover statistics used for improving network performance, e.g. HO failure rate or HO counts.

H04W 36/00835**{Determination of neighbour cell lists}****Definition statement***This place covers:*

Generation or update of neighbour cell lists; determination of target cell priorities in the neighbour cell lists; determination of a target neighbour cell.

H04W 36/00837**{Determination of triggering parameters for hand-off}****Definition statement**

This place covers:

Determination of thresholds values or any other type of values for which hand-off is triggered.

Determination of time when hand-off is triggered.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Reselection being triggered by specific parameters	H04W 36/24
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H04W 36/008375**{based on historical data}****Definition statement**

This place covers:

The hand-off criteria are derived/calculated from recorded network data. Preventing hand-off to target cells for which a short dwell time is expected.

H04W 36/00838**{Resource reservation for handover}****Definition statement**

This place covers:

Handover resource prioritization, handover pre-emption or disabling handover.

H04W 36/0085**{Hand-off measurements}****Definition statement**

This place covers:

Scanning for hand-off.

Determination of the time at which measurement shall be performed.

Arrangements and techniques for defining and determining parameters required for hand-off measurements, e.g. determination of thresholds for triggering hand-off measurements.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Measurements for self-organising networks (SON)	H04W 24/02
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Minimisation of drive tests (MDT)	H04W 24/10
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H04W 36/0088

{Scheduling hand-off measurements}

Definition statement

This place covers:

Determination of the time at which measures shall be performed.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Scheduling measurement reports; Arrangements for measurements reports	H04W 24/10
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H04W 36/0094

{Definition of hand-off measurement parameters}

Definition statement

This place covers:

Arrangements and techniques for defining parameters required for neighbour cell measurements.

H04W 36/02

Buffering or recovering information during reselection {; Modification of the traffic flow during hand-off}

Definition statement

This place covers:

Arrangements for avoiding loss of information transiting in the network during reselection of a, generally, new access point by temporary storage and subsequent delivery to the, generally, new selected access point. Resending or duplicating of data; temporary suspension of information flow. Sending the same data to several access points during handoff.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Flow control in the network	H04W 28/10
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H04W 36/023**{Buffering or recovering information during reselection}****Definition statement***This place covers:*

Sending data to a buffer during hand-off; reading data from a buffer during hand-off and sending the data to one or more access points

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Modification of an existing route due to handover	H04W 40/36
Sequence integrity	H04L 47/34

H04W 36/026**{Multicasting of data during hand-off}****Definition statement***This place covers:*

Sending the same data to several access points during handoff.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Site diversity, e.g. macro-diversity for radio transmission systems	H04B 7/022
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H04W 36/03**{Reselecting a link using a direct mode connection}****Definition statement***This place covers:*

Hand-off of a pre-established connection through an access point to a direct mode connection; Hand-off of a direct mode connection; wherein the direct mode connection is established in a pre-organized network or is established independently, e.g. ad hoc.

H04W 36/033**{in pre-organised networks}****Definition statement***This place covers:*

Handover of a pre-established connection through an access point to a direct mode connection or handover of direct mode connection from one cell to another.

H04W 36/035**{in self-organising networks}****Definition statement***This place covers:*

Handover of connection involving link(s) of self-organizing networks, e.g. for ad-hoc networks, Bluetooth® or sensor networks.

H04W 36/037**{by reducing handover delay, e.g. latency}****Definition statement***This place covers:*

Handover latency improvement for direct mode connections, e.g. for vehicle communication, vehicle-to-vehicle [V2V], vehicle-to-everything [V2X], vehicle-to-pedestrian [V2P] or vehicle-to-home [V2H].

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Services adapted for vehicle communication	H04W 4/40
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H04W 36/04**Reselecting a cell layer in multi-layered cells****Definition statement***This place covers:*

The connection is transferred between access points providing communication in areas of significantly different coverage. Macrocell/microcell hand-off, with the following features: hand-off within the same network authority and using the same air interface.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Reselecting a different type of service backbone for heterogeneous networks	H04W 36/125
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H04W 36/06**Reselecting a communication resource in the serving access point****Definition statement***This place covers:*

Arrangements where wireless communication(s) channel(s) are locally re-arranged without altering the fixed network connection(s); e.g. intra-cell hand-off, hand-off between sectors of one access point.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Wireless resource selection or (re-)allocation within a cell without exchange of handoff signalling messages	H04W 72/04
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H04W 36/08

Reselecting an access point

Definition statement

This place covers:

Arrangements where a different access point is selected, e.g. Intra BSC/RNC hand-off. In case of failure the previous access point can be reselected.

H04W 36/083

{wherein at least one of the access points is a moving node}

Definition statement

This place covers:

Arrangements where at least one of the access points involved in handoff/handover is a moving node, e.g. moving repeater(s), drone(s), unmanned aerial vehicle(s) [UAV], satellite(s) or airplane(s).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Space based or airborne stations	H04B 7/185
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H04W 36/085

{involving beams of access points}

Definition statement

This place covers:

Arrangements where during the handover a different beam of a different access point is selected.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cell structures using beam steering	H04W 16/28
Diversity systems	H04B 7/02

H04W 36/087

{between radio units of access points}

Definition statement

This place covers:

Specific units of the access point(s) are involved in the handover, e.g. distribution unit(s) (inter-gNB-DU handover) or remote components (e.g. remote radio heads/units or RRH/RRU).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Access points with remote components connected to the main body by cable, e.g. through CPRI interface	H04W 88/085
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H04W 36/10

Reselecting an access point controller

Definition statement

This place covers:

Arrangements where the reselected access point(s) belongs to a different access controller, e.g. inter BSC/RNC hand-off.

H04W 36/12

Reselecting a serving backbone network switching or routing node

Definition statement

This place covers:

The connection is transferred between serving nodes in the backbone network e.g. inter-MSC, inter-SGSN.

H04W 36/125

{involving different types of service backbones}

Definition statement

This place covers:

Reselecting a different type of service backbone for heterogeneous networks, e.g. between macro and femto cells; Reselecting a service backbone involving a service backbone bypassing mobility servers e.g. for local breakout in LIPA or for selected IP traffic offload SIPTO.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Management of mobility data for LIPA	H04W 8/082
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Reselecting a cell layer in multi-layer cells providing the same type of service backbone	H04W 36/04
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H04W 36/13

{Cell handover without a predetermined boundary, e.g. virtual cells}

Definition statement

This place covers:

Arrangements where at least one of the cells involved in handover are without a predetermined boundary, e.g. for virtual cells, cloud base station(s), network slice(s) or interzone handover (between group of cells).

H04W 36/14

Reselecting a network or an air interface

Definition statement

This place covers:

The connection is transferred to a different network or authority, e.g. inter-operator or inter-system hand-off.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control or signalling for completing the hand-off	H04W 36/0005
Transfer of connections of terminals with multi-SIM	H04W 76/19

H04W 36/142

{over the same radio air interface technology}

Definition statement

This place covers:

The connection is transferred to a different network or authority using the same radio air interface technology, e.g. inter-operator.

H04W 36/144

{over a different radio air interface technology}

Definition statement

This place covers:

The connection is transferred between different radio air interface technologies.

H04W 36/1443**{between licensed networks}****Definition statement***This place covers:*

The connection is transferred between licensed networks, e.g. UMTS-LTE or LTE-5G.

H04W 36/1446**{wherein at least one of the networks is unlicensed}****Definition statement***This place covers:*

The connection is transferred between networks comprising at least one unlicensed network, e.g. LTE-WLAN.

H04W 36/16**Performing reselection for specific purposes****Definition statement***This place covers:*

Handing over connections in order to improve the overall network performance, not the performance of the connection itself.

H04W 36/165**{for reducing network power consumption ([H04W 36/18](#) - [H04W 36/22](#) take precedence)}****Definition statement***This place covers:*

Hand-off of terminals for reducing overall network power consumption.

References**Limiting references***This place does not cover:*

Performing selection for specific purposes	H04W 36/18 - H04W 36/22
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H04W 36/18**for allowing seamless reselection, e.g. soft reselection****Definition statement***This place covers:*

Wireless links or data associations are temporarily added or deleted in such a manner that the terminal has at least one wireless link connected or one data association. The primary and the

Definition statement

temporarily added wireless link carry the same content. This group covers temporarily established parallel radio links or data associations for the purpose of maintaining a connection during a hand-off.

Data associations cover mobility data e.g. IP addresses.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Diversity systems, i.e. using permanently existing parallel connections for improving the robustness of the wireless connection	H04B 7/02
Diversity systems; Cooperative use of antennas of several nodes, e.g. in coordinated multipoint or cooperative MIMO	H04B 7/024

H04W 36/185

{using make before break}

Definition statement

This place covers:

Maintaining the link with the source node until the connection with the target cell is established, e.g. make before break.

H04W 36/20

for optimising the interference level

Definition statement

This place covers:

Transferring connections in order to avoid interference to/from neighbouring cells, e.g. confinement hand-off.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Allocation of wireless resources based on quality criteria	H04W 72/54
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H04W 36/22

for handling the traffic

Definition statement

This place covers:

Transferring connections in order to distribute the traffic to neighbouring cells, e.g. load shedding hand-off.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Load shedding arrangements	H04W 16/08
Load balancing or load distribution, transfer of traffic between already established connection	H04W 28/08
Handing over a connection due to low quality due to congestion	H04W 36/30

H04W 36/247

{by using coverage extension}

Definition statement

This place covers:

Handover being triggered by using cell range extension.

H04W 36/249

{according to timing information}

Definition statement

This place covers:

Handover being triggered based on timing information, e.g. at a specific time or after a specific time period.

H04W 36/26

by agreed or negotiated communication parameters

Definition statement

This place covers:

The reselection is performed in order to meet service level agreements.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Negotiating wireless communication parameters	H04W 28/18
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H04W 36/28

involving a plurality of connections, e.g. multi-call or multi-bearer connections

Definition statement

This place covers:

The reselection may be performed for selected parts of a plurality of connections of an user or terminal.

H04W 36/302**{due to low signal strength}****Definition statement***This place covers:*

Handoff/handover being triggered by perceived low signal strength.

H04W 36/304**{due to measured or perceived resources with higher communication quality}****Definition statement***This place covers:*

Handoff/handover being triggered based on perceiving resources with higher communication quality, e.g. higher data rate or higher throughput.

H04W 36/305**{Handover due to radio link failure (control signalling for hand-off failure [H04W 36/0079](#))}****Definition statement***This place covers:*

Triggering the handover due to failure of the current radio link.

References**Limiting references***This place does not cover:*

Control signalling for hand-off failure or rejection	H04W 36/0079
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H04W 36/36**by user or terminal equipment****Definition statement***This place covers:*

Comprises UE-centric handover.

H04W 36/362**{Conditional handover}****Definition statement***This place covers:*

Handover performed by the terminal when triggering condition sent by the network is fulfilled, e.g. based on stored configurations.

H04W 36/365**{by manual user interaction}****Definition statement***This place covers:*

The user's opinion on whether the hand-off should be carried out is requested or the user pre-configures under which conditions a hand-off is to be carried out.

H04W 36/385**{of the core network}****Definition statement***This place covers:*

E.g. under control of PCRF, MSC, HSS, HLR

H04W 40/00**Communication routing or communication path finding****Definition statement***This place covers:*

Techniques and arrangements for selectively establishing one or a plurality of communication paths involving at least one wireless path, from information sources to information sinks, over which information is communicated.

Techniques and arrangements for discovering, establishing, maintaining connectivity information among affiliated wireless equipment, e.g. routing lists.

Techniques and arrangements for path selection, path optimisation in network.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Packet switching systems	H04L 12/56
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H04W 48/00

Access restriction (access security to prevent unauthorised access
[H04W 12/08](#)); Network selection; Access point selection

Definition statement*This place covers:*

Techniques or arrangements for preventing user or terminal affiliation or for preventing use of network or access point resources or services.

Techniques or arrangements for selecting one or a plurality of networks, access points, or PoAs.

Techniques or arrangements for network or access point information delivery, e.g. discovery information delivery.

Definition statement

Access restriction is considered as restricting network access for any reason except security, performed without affiliation of a terminal. It can be implemented because of contract between user and provider, for the purpose of avoiding congestion, etc.

References

Limiting references

This place does not cover:

Access security to prevent unauthorised access	H04W 12/08
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Security arrangements	H04W 12/00
Hand-off or reselecting arrangements	H04W 36/00
Registration, e.g. affiliation to network, De-registration, e.g. terminating affiliation	H04W 60/00
Local resource management	H04W 72/00
Wireless channel access	H04W 74/00

H04W 48/02**Access restriction performed under specific conditions****Definition statement**

This place covers:

Techniques or arrangements for preventing one or a plurality of users or terminals to affiliate to a selected network or access point, or to use network or access point resources or services, e.g. by jamming broadcast, using barring information.

Preventing or restricting access to service.

This group also covers terminal data consulting, e.g. IMEI data consulting.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Access security	H04W 12/08
Fraud detection	H04W 12/12
Central resource management	H04W 28/16
Local resource management	H04W 72/00
Jamming of communication, Counter-measures	H04K 3/00

H04W 48/04

based on user or terminal location or mobility data, e.g. moving direction, speed

Definition statement

This place covers:

Affiliation, access or use is prevented or restricted in specific areas e.g. hospitals, or makes use of user or terminal behaviour information.

Access restriction to avoid influencing systems outside the network.

H04W 48/06

based on traffic conditions

Definition statement

This place covers:

Affiliation, access or use is prevented or restricted in response to or to avoid a congestion situation, e.g. cell barring.

H04W 48/08

Access restriction or access information delivery, e.g. discovery data delivery (signalling during connection [H04W 76/00](#))

Definition statement

This place covers:

Distribution, by network equipment to a user or terminal, of information e.g. for the purpose of selecting a network, a network service, a data network PoA or an access point. This group contains downlink delivery of discovery data.

References**Limiting references**

This place does not cover:

Signalling during connection	H04W 76/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Connectivity information management, e.g. connectivity discovery or update	H04W 40/24
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H04W 48/10**using broadcasted information****Definition statement**

This place covers:

The information is distributed by network equipment or by separate equipment on a channel which is distinct from a network communication or control channel e.g. bulletin board. This group contains broadcasting of network (discovery, access...) data for other networks.

H04W 48/12**using downlink control channel****Definition statement**

This place covers:

Using part of/or a network control channel, e.g. beacon channel. This group contains broadcasting of network (discovery, access...) data by the network on a downlink control channel.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Dynamic Wireless traffic scheduling; Dynamically scheduled allocation on shared channel using a grant channel	H04W 72/23
Non-scheduled or contention based access, e.g. random access, ALOHA, CSMA [Carrier Sense Multiple Access] using a dedicated channel for access	H04W 74/0866
Pilot transmitters or receivers for control of transmission or for equalising	H04B 1/76

H04W 48/14**using user query {or user detection}****Definition statement**

This place covers:

The information is sent by the network or access point in response to a user query or user presence detection.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Discovery of network devices, e.g. terminals	H04W 8/005
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H04W 48/16

Discovering, processing access restriction or access information

Definition statement

This place covers:

Searching for available networks, access points and/or communication services they provide; receiving provided discovery information.

Storage, updating, processing discovery information, generally at terminal or user equipment.

Covers also the discovery of the data network PoA

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Spread spectrum techniques in general for transmission systems using direct sequence modulation with code acquisition	H04B 1/7075
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H04W 48/17

{Selecting a data network PoA [Point of Attachment]}

Definition statement

This place covers:

Selecting, based on processed network information, communication service information, or user defined criteria, one or a plurality of data network PoA device(s) within wireless network infrastructure (e.g. PDSN [Packet Date Switching Node] device for immediate or deferred access or affiliation request.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reselecting a Data Network Point of Attachment	H04W 36/0011
Network selection for access arrangements in wide area data switching networks characterised by path configuration	H04L 12/5691

H04W 48/18

Selecting a network or a communication service

Definition statement

This place covers:

Based on processed network information, communication service information, or user defined criteria, one or a plurality of networks is (are) (re-)selected for immediate or deferred access or affiliation request. Selection of an air interface within a network, or selection of a service, or selection of a network domain in the core network. This group also covers selection between CS and PS domain, preferred PLMN, Home area, Localized Service Area selection.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Selecting a backbone service provider; Access to open networks	H04L 12/5691
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H04W 48/20

Selecting an access point

Definition statement

This place covers:

Based on processed access point information, or user defined criteria, one or a plurality of access points is (are) (re-)selected for immediate or deferred access or affiliation request. Selection of a cell served by an access point.

H04W 52/00

Power management {, e.g. Transmission Power Control [TPC] or power classes}

Definition statement

This place covers:

Techniques and arrangements for optimizing network or terminal performance by regulating the amount of power used by a wireless terminal or network equipment.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Gain control in transmitters or power amplifiers	H03G 3/3042
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H04W 52/02

Power saving arrangements

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Services signalling; Auxiliary data signalling, i.e. transmitting data via a non-traffic channel	H04W 4/20
Arrangements for remote connection or disconnection of substations or equipment thereof	H04L 12/12

H04W 52/0206**{in access points, e.g. base stations}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Access point devices specially adapted for wireless communication networks	H04W 88/08
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H04W 52/0209**{in terminal devices}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Terminal devices specially adapted for wireless communication networks	H04W 88/02
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H04W 52/262**{taking into account adaptive modulation and coding [AMC] scheme}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Systems modifying transmission characteristics according to link quality, e.g. power backoff	H04L 1/0001
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H04W 56/00**Synchronisation arrangements****Definition statement***This place covers:*

Techniques and arrangements for establishing or maintaining a predetermined synchronisation relationship between wireless terminal and network equipment or among wireless network equipment, e.g. time synchronisation or frequency synchronisation.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Synchronising arrangements in time-division multiplex systems	H04J 3/06
Pure clock synchronization when the synchronization is not used for traffic exchange in wireless communication	H04J 3/0679

Arrangements for synchronising receiver with transmitter	H04L 7/00
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H04W 60/00

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

Definition statement

This place covers:

- Registering, affiliating of an authorized user or terminal to a network;
- Re-registration of subscribers or terminals in the network;
- De-registration of subscribers or terminals from the network;
- Failure or rejection of the registration, re-registration or de-registration procedures;
- Registration with network slice(s);
- Tracking a subscriber or terminal by monitoring transmitted information e.g.
- location updates, communication information from the user or terminal either in response of a network's query, trigger event, periodical request or of his own volition, e.g. periodic registration;
- Structure of location areas;
- Mobility database structures therefore.

This group covers all registration procedures caused by the mobility of a terminal which are not induced by a hand-off.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network data management	H04W 8/00
Network addressing or numbering for mobility support for initial activation of new users	H04W 8/265
Tracking of users for legal interception	H04W 12/02
"Idle hand-off", i.e. reselection while user terminal is in an idle, non-connected state	H04W 48/18 , H04W 48/20

H04W 60/005

{Multiple registrations, e.g. multihoming}

Definition statement

This place covers:

Multiple affiliations to one or multiple networks or network domains e.g. Multiple WLAN affiliations, parallel affiliations to GSM and UMTS networks, simultaneous registration of more than one binding in one or several location register.

H04W 60/02**by periodical registration****Definition statement**

This place covers:

The user or terminal is requested to transmit registration information at scheduled intervals.

H04W 60/04**using triggered events****Definition statement**

This place covers:

The registration information is transmitted upon occurrence of specific events, e.g. change of location or routing area, network query. Also changing from idle to active mode at terminal in response to such queries.

H04W 60/06**De-registration or detaching****Definition statement**

This place covers:

Indication to the network, access point, user or terminal that affiliation will cease immediately or in a deferred manner; the indication may include information for maintaining or resuming affiliation.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Transfer of terminal data from a network towards a terminal	H04W 8/245
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H04W 64/00**Locating users or terminals {or network equipment} for network management purposes, e.g. mobility management****Definition statement**

This place covers:

Locating user or terminal or network equipment for the purpose of network management or for providing network services to the user or terminal.

References

Limiting references

This place does not cover:

Radio direction finding, determining distance or velocity by use of radio waves	G01S
Beacon or beacon systems transmitting signals having a characteristic or characteristics capable of being detected by non-directional receivers and defining directions, positions, or position lines fixed relatively to the beacon transmitters or receivers co-operating therewith	G01S 1/00
Direction-finders for determining the direction from which electromagnetic waves, not having a directional significance, are being received	G01S 3/00
Position-fixing by co-ordinating in general	G01S 5/00

H04W 64/003

{locating network equipment}

Definition statement

This place covers:

Locating network equipment for the purpose of network management or for providing network services to the user or terminal.

H04W 64/006

{with additional information processing, e.g. for direction or speed determination}

Definition statement

This place covers:

The measurements on the wireless network links are used to derive additional information, e.g. mobility data.

References

Limiting references

This place does not cover:

Systems for determining distance or velocity using radio waves	G01S 11/02
--	----------------------------

H04W 68/00

User notification, e.g. alerting and paging, for incoming communication, change of service or the like

Definition statement

This place covers:

Notifying one or a plurality of users specified as recipients of an incoming communication or changes in provided services. Selectively performing notifying in parts of the network, e.g. paging strategies. Techniques to increase efficiency of the notification channel. The notification uses specific wireless

channel(s) reserved/allocated for this purpose; Arrangements and techniques for defining/optimizing paging areas.

Notification, paging strategies based on established location update areas.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Messaging; Mailboxes; Announcements	H04W 4/12
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H04W 68/005

{Transmission of information for alerting of incoming communication}

Definition statement

This place covers:

Dedicated structure of paging channels (uplink, downlink, or both). This group covers paging channel structures and paging signalling

H04W 68/02

Arrangements for increasing efficiency of notification or paging channel

Definition statement

This place covers:

Techniques for enhancing notification attempts, e.g. changing the characteristics of the transmitted notification signal or notification channel(s) between unsuccessful attempts.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Transmission Power Control during retransmission after error or non-acknowledgment	H04W 52/48
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H04W 68/025

{Indirect paging}

Definition statement

This place covers:

Indirect paging, whereby a first paging message containing references to the actual paging information is transmitted, e.g. quick paging.

H04W 68/04**multi-step notification using statistical or historical mobility data****Definition statement***This place covers:*

The notification is performed using several attempts in an order based on user's habits or recent network interaction data. Notification based on mobility data, e.g. direction of move, speed.

H04W 68/06**using multi-step notification by changing the notification area****Definition statement***This place covers:*

The notification is performed using several attempts involving different network areas between unsuccessful attempts.

H04W 68/08**using multi-step notification by increasing the notification area****Definition statement***This place covers:*

The notification is performed using several attempts and increasing the initial area by including surrounding network areas between unsuccessful attempts.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Arrangements for increasing efficiency of notification or paging channel	H04W 68/02
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H04W 68/10**using simulcast notification****Definition statement***This place covers:*

The incoming communication is notified over the whole network.

H04W 68/12

Inter-network notification

Definition statement

This place covers:

The notification is conducted simultaneously or sequentially in a plurality of networks. Notification over other subscribed networks when user is unreachable/idle; Using notification associated with different services provided by one (the same) network.

H04W 72/00

Local resource management

Definition statement

This place covers:

Processing originating user or terminal resource requests for the purpose of allocating one or a plurality of local wireless resources to the user or terminal.

Allocating one or a plurality of local wireless resources in response to a terminating user or terminal communication request.

Controlling wireless resource requests and wireless resource allocation among contending users or terminals.

Selection of wireless resources by user or terminal.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network traffic or resource management	H04W 28/00
Central resource management	H04W 28/16
Negotiating wireless communication parameters	H04W 28/18
Resource reservation	H04W 28/26
Arrangements affording multiple use of the transmission path	H04L 5/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Relaying terminal	means terminal equipment (as such covered by H04W 88/02) considered as local access point for the requester.
RRC	Radio resource control
MAC-CE	MAC control element
D2D	Device to device
URLLC	"Ultra-Reliable Low-Latency Communication [URLLC]" means a set of features that provide low latency and ultra-high reliability for mission critical applications such as industrial internet, smart grids, remote surgery and intelligent transportation systems.

H04W 72/02

Selection of wireless resources by user or terminal

Definition statement

This place covers:

The user or terminal decides on the resources to be choose

H04W 72/04

Wireless resource allocation

Definition statement

This place covers:

Allocation of wireless resources or adaptation of assigned wireless resources of an access point or of a regulating authority of a self-organizing network for the purpose of communication with user or terminal; (Semi-) persistent scheduling; Allocation of channels to users.

Semi-persistent scheduling is understood as resource allocation, because the allocation of resources is not changed every transmission frame or slot. Re-allocation, i.e. a modification of an existing allocation plan is included, in case it does not involve handover signalling procedures.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network deployment, e.g. resource partitioning or cells structures	H04W 16/00
Reselecting a communication resource in the serving access point	H04W 36/06
Scheduling is applied when selected data flows are multiplexed onto a wireless resource, the necessary allocation is implicitly executed	H04W 72/12
Cooperative use of antennas of several nodes, e.g. in coordinated multipoint or cooperative MIMO [Multiple Input Multiple Output]	H04B 7/024
Arrangements for detecting or preventing errors in the information received, modifying transmission characteristics according to link quality	H04L 1/0001
Arrangements affording multiple use of the transmission path	H04L 5/00

H04W 72/044

based on the type of the allocated resource

Definition statement

This place covers:

Allocation plan is based on a particular type of wireless resources to a user or terminal. Allocating complex or combinational resources, e.g. resource blocks in time-frequency domain.

H04W 72/0446**Resources in time domain, e.g. slots or frames****Definition statement**

This place covers:

Allocation of wireless resources to a user or terminal, where the resource allocated is a specified section of a time-based resource. The allocated resource can be specified indicating the start and stop times, or by indicating the identity of a known time-specified resource unit (e.g. slot)

H04W 72/0453**Resources in frequency domain, e.g. a carrier in FDMA****Definition statement**

This place covers:

The resource allocated is a specified portion of a frequency-based resource. The resource can be specified e.g. by indicating the top/bottom frequencies, or by indicating the identity of a known frequency-specified resource unit (e.g. carrier)].

H04W 72/046**{the resource being in the space domain, e.g. beams}****Definition statement**

This place covers:

The resource allocated is a specified portion of a space-based resource. The resource can be specified by indicating the sector or area where an operation may take place, or by indicating the identity of a known spatially-specified resource unit, e.g. sector, area.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Cell structures using beam steering	H04W 16/28
Multi-antenna systems using beam selection at the transmitting station	H04B 7/0695
Multi-antenna systems using beam selection at the receiving station	H04B 7/088

H04W 72/0466**{the resource being a scrambling code}****Definition statement**

This place covers:

The resource allocated is a code.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Orthogonal multiplex systems	H04J 11/00
Code multiplex systems	H04J 13/00

H04W 72/0473

{the resource being transmission power}

Definition statement

This place covers:

The resource allocated is defined in terms of transmission power.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Transmission power control management, i.e. sharing limited amount of power among users or channels or data types, e.g. cell loading	H04W 52/34
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H04W 72/12

Wireless traffic scheduling

Definition statement

This place covers:

Techniques and arrangements for:

- establishing the order of transmission of pending traffic information over one or a plurality of the access point's wireless resources. The order of transmission is based on precedence/priority of the information, priority of the information source or recipient or defined resource usage policy.
- notifying user(s) of granted transmission request(s).
- assigning traffic (of one or more users) to existing channels.
- wireless multiplexing of several flows into one single stream on the wireless interface. It applies to up- and downlink.
- scheduled allocation of resources, allocation change can be signalled and changed every transmission frame or slot, i.e. scheduling is applied when selected data flows are multiplexed onto a wireless resource; the necessary allocation is implicitly executed.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Adaptation of traffic data packets received from higher layers onto packet transmission requirements of lower layer, e.g. SDU onto PDU"	H04W 28/065
Flow control in the network	H04W 28/10
Power saving arrangements using pre-established activity schedule	H04W 52/0216

Semi-persistent scheduling is understood as resource allocation, because the allocation of resources is not changed every transmission frame, slot	H04W 72/04
Discontinuous transmission or reception	H04W 76/28
Arrangements for detecting or preventing errors in the information received, modifying transmission characteristics according to link quality	H04L 1/0001
Flow control in packet switching networks	H04L 47/10

H04W 72/121

for groups of terminals or users

Definition statement

This place covers:

Schedule is established jointly for a group of users; Definition of scheduling group; Assigning group identifier

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

User group management	H04W 4/08
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H04W 72/1215

{for collaboration of different radio technologies}

Definition statement

This place covers:

Schedule is defined to provide for a disturbance free usage of different radio technologies by one network element

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Spectrum sharing arrangements [between different networks	H04W 16/14
Terminal device adapted for operation in multiple networks, e.g. multi-mode terminals	H04W 88/06
Access point device adapted for operation in multiple networks, e.g. multi-mode access points	H04W 88/10
Programme switching, task transfer initiation or dispatching by program, scheduling strategies for dispatcher	G06F 9/4881
Allocation of resources to service a request, the resources being hardware resources other than CPUs, Servers and Terminals	G06F 9/5011

Special rules of classification

Collaborative techniques,

- in terminals should receive the [H04W 88/06](#) code as additional information
- in base stations should receive the [H04W 88/10](#) code as additional information.

H04W 72/1221

{based on age of data to be sent}

Definition statement

This place covers:

Schedule definition is based on the time traffic data has been already waiting for transport e.g. in a terminal or base station buffer

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Flow control in the network using intermediate storage	H04W 28/14
Schedule definition, set-up or creation based on load	H04W 72/52

H04W 72/1263

Mapping of traffic onto schedule, e.g. scheduled allocation or multiplexing of flows

Definition statement

This place covers:

Application of a (pre-defined) schedule to accomplish the transport of traffic data over a wireless link. Mapping of traffic data onto a schedule pattern which is defined by the physical parameters used for quantising the wireless medium, e.g. a combination of a frequency and time slots in OFDMA. Also covers cases where scheduling effectively leads to a (temporary) allocation of resources.

H04W 72/1268

of uplink data flows

Definition statement

This place covers:

Schedule usage for uplink data flows.

H04W 72/1273

of downlink data flows

Definition statement

This place covers:

Schedule usage for downlink data flows

H04W 72/20

Control channels or signalling for resource management

Definition statement

This place covers:

Allocation-related communication among nodes, e.g. mobile stations, access points, leading to a transfer of control information, e.g. a request for or an assignment of resources as well as descriptive information needed therefore. Control information exchanged via multiple interfaces or directions of similar importance. Resource allocation for control channels.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Transfer of user or subscriber data	H04W 8/20
Transmission and use of information for re-establishing the radio link of resource information of target access point	H04W 36/0072

Special rules of classification

Resource allocation for control channels should be classified in [H04W 72/20](#) and with an additional symbol for the specific resource allocation aspect.

H04W 72/21

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

Definition statement

This place covers:

Allocation-related communication from a mobile station to an access point, from a mobile station to a relay node, or from a relay node to an access point. The allocation-related communication comprises e.g. requesting an allocation, or other allocation related issues.

H04W 72/23

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

Definition statement

This place covers:

Allocation-related communication from an access point to a mobile station, from an access point to a relay node, or from a relay node to a mobile station. The allocation-related communication comprises e.g. transmission of the allocation plan, or other allocation related issues.

H04W 72/27**between access points****Definition statement**

This place covers:

Allocation-related communication between access points, e.g. notifying the next access point about the resources allocated at the present access point.

H04W 72/29**between an access point and the access point controlling device****Definition statement**

This place covers:

Allocation related communication between an access point and a device controlling the access point, e.g. parameter settings to be applied by the access point. The access point can be a distributed unit and the access point controlling device can be a central unit in a distributed base station or cloud RAN.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Central resource management; Negotiating of resources	H04W 28/16
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H04W 72/30**Resource management for broadcast services****Definition statement**

This place covers:

Allocation of specific resources for broadcast/multicast purposes; reselection of preferred frequency layers (reselecting a different broadcast carrier when service is interrupted on the one in use).

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Central resource management	H04W 28/16
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H04W 72/51**based on terminal or device properties****Definition statement**

This place covers:

Allocation of resources on the basis of properties related to the terminal/device to which resources are to be allocated, e.g. location, mobility status, operating applications.

Properties either are known by or reported to the instance making the allocation decision.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Processing or transfer of terminal data, e.g. status or physical capabilities	H04W 8/22
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H04W 72/52

based on load

Definition statement

This place covers:

Allocation of resources based on the load of the stations involved or level of usage of resources.

H04W 72/53

based on regulatory allocation policies

Definition statement

This place covers:

Allocation of resources making use of explicit instructions/regulations, whose application directly leads to a specified and well-defined allocation plan.

H04W 72/535

{based on resource usage policies}

Definition statement

This place covers:

Schedule definition based on a usage policy related to a resource or entity involved in transmission of the traffic data, e.g. fairness of transmission opportunity, opportunistic scheduling, synchronised switch between uplink and downlink transmission.

H04W 72/54

based on quality criteria

Definition statement

This place covers:

Allocation of resources on the basis of quality of communication provided by the links or stations involved.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Definition of hand-off measurement parameters; Arrangements and techniques for reducing the perturbation due to measuring activities performed for neighbour cell list measurements, e.g. compressed mode	H04W 36/0094
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H04W 72/541

using the level of interference

Definition statement

This place covers:

Allocation of resources on the basis of interference on the air interface or faced by the stations involved, e.g. co-channel interference; Arrangements and techniques for measuring or sensing the primary network in a cognitive radio, e.g. "quiet period".

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Spectrum sharing arrangements between different networks	H04W 16/14
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Special rules of classification

Defining or using a "quiet period" for sensing for the primary network in cognitive radio should be classified in [H04W 72/54](#) with an additional symbol in [H04W 16/14](#).

H04W 72/542

using measured or perceived quality

Definition statement

This place covers:

Allocation of resources on the basis of the measured quality of communication provided by the air interface or stations involved, e.g. C/I or BER.

H04W 72/543

based on requested quality, e.g. QoS

Definition statement

This place covers:

Allocation of resources on the basis of the requested quality of communication provided by the air interface or stations involved.

H04W 72/56

based on priority criteria

Definition statement

This place covers:

Allocation of resources on the basis of priority of the traffic communicated, or the priority of the stations involved.

H04W 72/563**of the wireless resources****Definition statement**

This place covers:

Allocation of resources on the basis of ranking criteria of the wireless resources, e.g. preferred channel list. Usually, a ranking criterion exists before a decision on allocation is made.

H04W 72/566**of the information or information source or recipient****Definition statement**

This place covers:

Schedule definition is based on the precedence or priority of the information to be transmitted or the precedence or priority of the information source or recipient.

H04W 72/569**{of the traffic information}****Definition statement**

This place covers:

Schedule definition is based on a precedence or priority of the traffic information to be transmitted.

H04W 74/00**Wireless channel access****Definition statement**

This place covers:

Techniques or arrangements for managing user or terminal access requests.

Techniques or arrangements for arbitration of access between contending users.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

random access procedure	procedure where a terminal performs access to a 3GPP-standard based network on a random access channel
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H04W 74/002**{Transmission of channel access control information}****Definition statement**

This place covers:

Channel access related information is transmitted between access point and user or terminal.

Exchange of information relevant for a random access procedure between nodes. Covers structures

of control channels for access; transmission of access information to be used for access channels; access information format.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Transmission and use of information for re-establishing the radio link of access information of target access points	H04W 36/0077
Access restriction or access information delivery, e.g. discovery data delivery	H04W 48/08
Random access procedures, e.g. with 4-step access	H04W 74/0833
Random access procedures, e.g. with 2-step access	H04W 74/0836
Random access procedures using contention-free random access [CFRA]	H04W 74/0838

H04W 74/004

{in the uplink, i.e. towards network}

Definition statement

This place covers:

Channel access related information is sent by a user or terminal towards an access point. A user equipment signals random access information to a radio base station, e.g. RA [Random Access] request, M1 message in LTE [Long Term Evolution].

H04W 74/006

{in the downlink, i.e. towards the terminal}

Definition statement

This place covers:

Channel access related information is send from access point to user or terminal. A radio base station signals random access information to a user equipment, e.g. RA [Random Access] request response, M2 message in LTE [Long Term Evolution], parameter provisioning)

H04W 74/02

Hybrid access

Definition statement

This place covers:

Automatic selection of an access technique, e.g. scheduled or non-scheduled with respect to network, user(s) requirements or channel conditions

H04W 74/04

Scheduled access (hybrid access [H04W 74/02](#))

Definition statement

This place covers:

Users are scheduled for transmission in an orderly fashion generally by a controller or are aware of their scheduled transmission rights.

Covers also Slotted access.

References

Limiting references

This place does not cover:

Hybrid access	H04W 74/02
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H04W 74/06

using polling

Definition statement

This place covers:

- Users or terminals are polled for their immediate transmission requirements and channel access is granted accordingly.
- Invitation for transmission and trigger frames (IEEE 802.11ax).
- Slotted polling.

H04W 74/08

Non-scheduled access, e.g. ALOHA (hybrid access [H04W 74/02](#))

Definition statement

This place covers:

Access to the shared wireless channel is performed without full awareness of other users' or channel state.

This group covers the random access as such.

Covers also Slotted ALOHA.

References

Limiting references

This place does not cover:

Hybrid access	H04W 74/02
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H04W 74/0808**using carrier sensing, e.g. carrier sense multiple access [CSMA]****Definition statement***This place covers:*

Before transmission, the sender listens to the shared medium to detect transmissions by others. Typical examples are clear channel assessment [CCA] and listen-before-talk [LBT]. It also covers slotted carrier sense multiple access [CSMA].

H04W 74/0816**with collision avoidance****Definition statement***This place covers:*

Besides listening to the shared medium additional measures are taken in order to avoid collisions, e.g. notifying other senders of an intended transmission, RTS / CTS. Covers also Slotted CSMA

H04W 74/0825**{with collision detection}****Definition statement***This place covers:*

If, despite performing carrier sensing, collisions can not be completely avoided, their occurrence is at least detected. Covers also Slotted CSMA

H04W 74/0833**Random access procedures, e.g. with 4-step access****Definition statement***This place covers:*

In the framework of a given (multiple) access scheme the actual access to the shared medium takes place at a random instance without prior carrier sensing.

H04W 74/0841**{with collision treatment}****Definition statement***This place covers:*

Taking additional measures to mitigate collisions that occur during random access procedures, e.g. allocating higher priority random access preambles to high-priority users or terminals to reduce collision occurrences involving those users or terminals.

H04W 74/085**{collision avoidance}****Definition statement***This place covers:*

Measures are taken in order to avoid further collisions, e.g. applying a time back-off for retransmissions.

H04W 74/0858**{collision detection}****Definition statement***This place covers:*

In cases where collisions can not be avoided, their occurrence is at least detected.]

H04W 74/0866**{using a dedicated channel for access}****Definition statement***This place covers:*

Access requests are transmitted on a distinct channel, normally allocated or defined by a controlling entity, e.g. an access point. This group covers the usage of an uplink control channel, i.e. a frequency, a code, a time slot, a frame section.

H04W 74/0875**{with assigned priorities based access}****Definition statement***This place covers:*

Users access the dedicated channel in an order established by a controlling entity, e.g. an access point

H04W 74/0883**{for un-synchronized access}****Definition statement***This place covers:*

Access to the dedicated channel is performed at random time, e.g. no frame structure exist or is respected.

H04W 74/0891

{for synchronized access}

Definition statement

This place covers:

Access to the dedicated channel is performed respecting a time structure on the channel, e.g. a frame or slot structure.

H04W 76/00

Connection management

Definition statement

This place covers:

Techniques and arrangements for selecting and establishing one or a plurality of connections (e.g. tunnels), recovering or reconnecting accidentally lost connections.

Switching or re-directing connection or control function.

De-allocating, re-claiming one or a plurality of established communication resources no longer in use.

Signalling arrangements therefore.

Connection state management, e.g. idle mode; allocation of reserved affiliation/binding connection identifiers associated with one or a plurality of the managed connections.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Communication routing or communication path finding	H04W 40/00
Session management in data packet switching networks	H04L 67/14

H04W 76/11

Allocation or use of connection identifiers

Definition statement

This place covers:

Assignment or use of one or a plurality of connection identifiers when establishing a connection.

Note:

A connection identifier is specific to a connection itself, e.g. flow identifier or link identifier (not calling/called party identifier, network identifier such as SSID).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network addressing or numbering for mobility support	H04W 8/26
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Network arrangements or network protocols for addressing or naming	H04L 61/00
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H04W 76/12

Setup of transport tunnels

Definition statement

This place covers:

Techniques and arrangements for establishing a tunnel/bearer connection for transport in the network, e.g. PDP Context establishment.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Protecting privacy or anonymity	H04W 12/02
Arrangements for network security	H04L 63/00

H04W 76/14

Direct-mode setup

Definition statement

This place covers:

Setup of a direct mode connection in a hierarchical pre-organized network whereby the establishment is done either directly between users/terminals or via relaying equipment, e.g. establishment of a wireless connection between two peers.

The user/terminal equipment establishes a direct communication with another user/terminal equipment on a communication channel defined or negotiated via the network. The direct connection between regular members of a network must be a special mode of operation.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Discovery of network devices, e.g. terminals	H04W 8/005
Set up of a connection, e.g. between Bluetooth® terminals or between terminals belonging to self-organizing networks, e.g. ad-hoc networks or sensor, mesh networks	H04W 84/18
Terminal devices adapted for relaying to or from another terminal or user	H04W 88/04

H04W 76/15

Setup of multiple wireless link connections

Definition statement

This place covers:

Techniques and arrangements for establishing a plurality of wireless communication links for transferring information to one user/terminal, i.e. multi-call, multi-bearer connection.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Multichannel or multilink protocols	H04L 69/14
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H04W 76/16

Involving different core network technologies, e.g. a packet-switched [PS] bearer in combination with a circuit-switched [CS] bearer

Definition statement

This place covers:

The mobile network correlates establishment of multiple bearers across at least two different radio access technologies or core network domain technologies in parallel for one and the same end user session. The mobile network introduces a certain level of cooperation between, e.g. a 5G bearer and an LTE bearer.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control or signalling for completing the hand-off for transferring sessions between adjacent core network technologies	H04W 36/0022
Reselecting a network or an air interface	H04W 36/14

H04W 76/18

Management of setup rejection or failure

Definition statement

This place covers:

Techniques and arrangements for the purpose of establishing an alternate connection after the initial connection request being unsuccessful, e.g. retry strategies after rejection or after no response. Rejection of a request for establishing a connection.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network traffic or resource management, Error control	H04W 28/04
Access restriction performed under specific conditions	H04W 48/02
Reactions to resource unavailability in packet switching systems	H04L 47/74

H04W 76/19

Connection re-establishment

Definition statement

This place covers:

Recovering or reconnecting an accidentally lost connection.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control or signalling for completing the hand-off for data session or connection with transfer of context information	H04W 36/0033
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H04W 76/20

Manipulation of established connections

Definition statement

This place covers:

- Switching, re-routing connection or control function in addition to those necessary to establish or maintain connection between users or terminals.
- In-connection signalling, notification, connection state transition to and from e.g. hibernation or dormant mode.
- Connection manipulation aspects of DTX or DRX not related to power saving arrangements.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Hand-off or reselecting arrangements	H04W 36/00
Modification of an existing route due to handover	H04W 40/36
Power saving arrangements	H04W 52/02

H04W 76/22

Manipulation of transport tunnels

Definition statement

This place covers:

Techniques and arrangements for redefining a transport tunnel connection in the network, e.g. PDP context modification.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control or signalling for completing the hand-off for data session or connection for hand-off preparation	H04W 36/0016
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H04W 76/23

Manipulation of direct-mode connections

Definition statement

This place covers:

Transition in a hierarchical pre-organized network between direct mode and via third parties mode. Release of non-active connection legs after the transition.

H04W 76/25

Maintenance of established connections

Definition statement

This place covers:

Techniques and arrangements for maintaining an already established connection and avoiding the release of the resources, e.g. transmitting a "keep-alive" packet over the packet protocol context so as to maintain the packet protocol context.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Session management in data packet switching networks	H04L 67/14
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H04W 76/27

Transitions between radio resource control [RRC] states

Definition statement

This place covers:

Transitions between RRC states which reflect the level of user equipment connection and which transport channels can be used by the user equipment, e.g. transition between IDLE, CELL_FACH, CELL_DCH, CELL_PCH and URA_PCH states.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Power saving arrangements	H04W 52/02
Connection setup	H04W 76/10

H04W 76/28

Discontinuous transmission [DTX]; Discontinuous reception [DRX]

Definition statement

This place covers:

Connection management aspects of DTX or DRX, e.g. timing or tuneaway.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Determination of parameters used for hand-off, e.g. generation or modification of neighbour cell lists	H04W 36/0083
Use of DTX/DRX for mainly power saving arrangements	H04W 52/02

H04W 76/30

Connection release

Definition statement

This place covers:

- De-allocating one or a plurality of established connections.
- Signalling therefor.

H04W 76/32

Release of transport tunnels

Definition statement

This place covers:

Techniques and arrangements for releasing a transport tunnel connection in the network, e.g. PDP Context deactivation.

H04W 76/34

Selective release of ongoing connections

Definition statement

This place covers:

Techniques and arrangements for partially releasing connections of one or a plurality of users. Also release of one or a plurality of connections involved in a multi-call.

H04W 76/36**for reassigning the resources associated with the released connections****Definition statement***This place covers:*

Techniques and arrangements for forcibly releasing one or a plurality of the ongoing connections according to criteria like the priority of the users, priority of the information to be transmitted or activity related factors for the purpose of re-assigning the released resources. e.g. call pre-emption.

H04W 76/38**triggered by timers****Definition statement***This place covers:*

Techniques and arrangements for releasing connections according to inactivity timers.

H04W 76/40**for selective distribution or broadcast****Definition statement***This place covers:*

Connection set up for allowing a plurality of users or terminals to be included in a singlecommunication. Connection set up for special broadcast or group call services, e.g. emergency broadcast, CUG, VPN, PTT, PoC (PTT on Cellular), P_{2C} (Press to Connect).

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Broadcast or conference, e.g. multicast	H04L 12/18
Arrangements for connecting several subscribers to a common circuit, i.e. affording conference facilities	H04M 3/56

H04W 76/45**for Push-to-Talk [PTT] or Push-to-Talk over cellular [PoC] services****Definition statement***This place covers:*

Communication is established among members of a predefined group by an active user with a talk request over usually a half-duplex channel.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Trunked mobile radio systems	H04W 84/08
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Arrangements for real-time multimedia communications - Push-to-X services	H04L 65/4061
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H04W 76/50

for emergency connections

Definition statement

This place covers:

- Connection set up requiring an urgent or hazardous situation; emergency connection set up techniques wherein an originating terminal creates an emergency communication to a central;
- Connection set up in disastrous scenarios wherein a central creates an emergency communication to a terminating terminal or a group of terminals.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Alarm systems in which the location of the alarm condition is signalled to a central station, e.g. fire or police telegraphic systems, characterised by the transmission medium, using wireless transmission systems	G08B 25/10
Cordless telephones for supporting an emergency service	H04M 1/72418
Centralised call answering arrangements requiring operator intervention for emergency applications	H04M 3/5116

H04W 80/00

Wireless network protocols or protocol adaptations to wireless operation

Definition statement

This place covers:

Generic data protocols for operation of wireless media and implemented at particular network layers.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network security protocols	H04L 63/00
Media handling, encoding, streaming or conversion	H04L 65/60
Network protocols for data switching network services	H04L 67/01

Special rules of classification

Classification symbols of this group should preferably only be allocated as "additional information".

H04W 84/00

Network topologies

Definition statement

This place covers:

Networks characterized by a specific organisation of network equipments, e.g. wireless access points, or linking infrastructure thereof.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Active relay systems	H04B 7/15
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Special rules of classification

Classification symbols of this group should preferably only be allocated as "additional information" in combination with at least one symbol of the functional groups [H04W 4/00](#) - [H04W 76/00](#).

H04W 84/005

{Moving wireless networks}

Definition statement

This place covers:

The wireless network(s) with their affiliated terminals or users are moving with respect to a linked overlaying wireless network(s).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Services for mass transport vehicles, e.g. buses, trains, or aircraft	H04W 4/42
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H04W 84/02

Hierarchically pre-organised networks, e.g. paging networks, cellular networks, WLAN [Wireless Local Area Network] or WLL [Wireless Local Loop]

Definition statement

This place covers:

Networks with a pre-established organization i.e. users are normally not responsible for or network configuration or management.

H04W 84/027**{providing paging services}****Definition statement***This place covers:*

Providing paging services to users

H04W 84/04**Large scale networks; Deep hierarchical networks****Definition statement***This place covers:*

Networks of large scale, e.g. nationwide, using a plurality of hierarchically

interconnected selecting equipments for path finding or routing communication(s) within the network from/to a wireless user. The communication(s) can originate or terminate from/in an external network e.g. cellular systems.

H04W 84/042**{Public Land Mobile systems, e.g. cellular systems}****Definition statement***This place covers:*

A PLMN typically consists of several cellular technologies like GSM/2G, UMTS/3G, LTE/4G, 5G offered by a single operator within a given country, often referred to as a cellular network. A PLMN comprises a Radio Access Network, RAN, a Core Network, CN, as well as an Operation and Management Subsystem, OMS.

H04W 84/045**{using private Base Stations, e.g. femto Base Stations, home Node B}****Definition statement***This place covers:*

PLMS [Public Land Mobile systems] where additional access points are deployed by a private entity and operated under the control of the public network operator/administrator for providing exclusive private services and/or additional coverage or enhanced communication services to affiliated PLMS network users.

H04W 84/047**{using dedicated repeater stations}****Definition statement***This place covers:*

PLMN using dedicated relay/repeater stations (not relaying terminals)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cell enhancers or enhancement, e.g. for tunnels, building shadow	H04W 16/26
Self organising networks with access to wired networks	H04W 84/22
Terminal devices adapted for relaying to or from another terminal or user	H04W 88/04

H04W 84/06

Airborne or Satellite Networks (space-based or airborne stations [H04B 7/185](#))

References

Limiting references

This place does not cover:

Space-based or airborne stations	H04B 7/185
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H04W 84/08

Trunked mobile radio systems

Definition statement

This place covers:

Dedicated systems in which, generally a half duplex communication channel is shared among a predefined group of users.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Push-to-Talk or Push-on-Call services	H04W 4/10
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H04W 84/10

Small scale networks; Flat hierarchical networks

Definition statement

This place covers:

Networks of small, local or limited size with a wired or wireless backbone connected to access points, e.g. private, corporate networks.

H04W 84/105

{PBS [Private Base Station] network ([H04W 84/12](#) - [H04W 84/16](#) take precedence)}

Definition statement

This place covers:

Access point owned and operated by a private entity, i.e. non-public operator for its own exclusive use. The PBS remains in, or forms on its own, a separate network or is connected to a PBX

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Small scale networks; Flat hierarchical network	H04W 84/12 - H04W 84/16
Access point device	H04W 88/08

Special rules of classification

In practice, all documents falling under coverage of [H04W 84/105](#) are all classified in [H04W 84/105](#) unless they fit at least into one of the groups [H04W 84/12](#) - [H04W 84/16](#).

H04W 84/12

WLAN [Wireless Local Area Networks]

Definition statement

This place covers:

Local area networks providing wireless access to stations connecting to one or more access points within a limited area. May operate as an isolated network or may connect to an external (public) network. WLANs operating according to IEEE 802.11 specifications are called Wi-Fi® networks.

H04W 84/14

WLL [Wireless Local Loop]; RLL [Radio Local Loop]

Definition statement

This place covers:

Networks in which subscribers with zero or limited mobility have wireless access to a public network.

Networks in which fixed subscribers have wireless access to a public network.

Radio concentration equipment for subscriber premises.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Terminal device adapted for Wireless Local Loop operation	H04W 88/021
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H04W 84/16

WPBX [Wireless Private Branch Exchange]

Definition statement

This place covers:

Networks in which wireless subscribers are connected by a Private Branch Exchange (PBX).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Substation extension arrangements; Mobile telephones; Cordless telephones	H04M 1/71 ; H04M 1/72
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H04W 84/18

Self-organising networks, e.g. ad-hoc networks or sensor networks

Definition statement

This place covers:

- User-based networks without hierarchical organisation.
- Users define network(s) or affiliation(s), can elect a regulating authority (leader) or can act as relaying device on behalf of other users.
- Affiliation of users to network(s) and user's roles in the network(s) can be dynamically changed.
- Creation and termination of user-defined networks.
- Single-hop or multi-hop networks for communication between network nodes having no predetermined connectivity and no pre-defined central control.
- Responsibilities for establishing, maintaining and controlling the network's organisation are distributed among the nodes dynamically.
- The nodes are either capable of relaying messages between pairs of nodes not having a direct communication link (multi-hop networks) or they communicate directly without having a specific pre-defined association (single hop).
- Membership in the ad-hoc network may be dynamic.
- Interrogation networks are considered self-organizing networks.
- Leader-follower aspects as part of the ad-hoc network.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Distributed application using peer-to-peer [P2P] networks	H04L 67/104
Arrangements for proprietary or special purpose networking environments, e.g. medical networks, sensor networks, networks in a car involving the management of devices over a network	H04L 67/125

H04W 84/20

Leader-follower arrangements

Definition statement

This place covers:

Techniques and arrangements to (re-)elect a user as regulating authority.

This group covers only the (re-)election of a leader (also "transfer" of leader role).

H04W 84/22

with access to wired networks

Definition statement

This place covers:

Techniques and arrangements for connection of a self-organizing network to a wired network through an access point.

H04W 88/00

Devices specially adapted for wireless communication networks, e.g. terminals, base stations or access point devices

Definition statement

This place covers:

Devices specially adapted for wireless communication networks, e.g. terminal equipment;

Wireless access network equipment e.g. access point, access point controllers;

Switching or routing equipment in wireless backbone networks,

gateways, service support - and network management equipment.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Transceivers	H04B 1/38
Data switching networks	H04L 12/00
Substation equipment for telephonic communication	H04M 1/00
Selecting	H04Q
Casings, cabinets or drawers for electric apparatus	H05K 5/00

Special rules of classification

Classification symbols of this group should preferably only be allocated as "additional information" in combination with at least one symbol of the functional groups [H04W 4/00](#) - [H04W 76/00](#).

H04W 88/005**{Data network PoA devices}****Definition statement**

This place covers:

Logical entity within wireless network or mobility management infrastructure providing access to a data network for a wireless user.

H04W 88/02**Terminal devices****Definition statement**

This place covers:

Physical equipment acting with network as/on behalf of a user, thereby behaving as an endpoint of a network functionality. This group contains more than just details of terminal construction. Instead, the emphasis is on "acting with network", i.e. a terminal having network functionality.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Portable computers with a single-body enclosure integrating a flat display, e.g. personal digital assistants	G06F 1/1626
Transceivers, i.e. devices in which transmitter and receiver form a structural unit and in which at least one part is used for functions of transmitting and receiving	H04B 1/38
Substation equipment for telephonic communication	H04M 1/00

H04W 88/025**{Selective call decoders}****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Network addressing or numbering for mobility support	H04W 8/26
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H04W 88/04**adapted for relaying to or from another terminal or user****Definition statement**

This place covers:

Terminal device providing the additional functionality of acting as a relay e.g. on behalf of a different terminal, forwarding information to/from said terminal.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cell enhancers or enhancement, e.g. for tunnels, building shadow	H04W 16/26
Public land mobile networks using dedicated repeater stations	H04W 84/047
Active relay systems	H04B 7/15

H04W 88/06

adapted for operation in multiple networks {or having at least two operational modes}, e.g. multi-mode terminals

Definition statement

This place covers:

Terminal equipment able to operate using at least two different communication technologies or standards, or different versions of a standard in a single network or multiple networks, e.g. packet-switched and circuit-switched operation, analog-digital, WLAN-cellular, GSM900-GSM1800.

Terminal equipment with at least two operational modes; multiple operational modes are understood to mean significantly different operations, which would be equivalent to deeming the operations to take place in two different networks.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Power saving arrangements	H04W 52/02
Hybrid wireless channel access techniques	H04W 74/02
Connection manipulation, discontinuous transmission or reception	H04W 76/28
Transceivers with more than one transmission mode	H04B 1/406

H04W 88/08

Access point devices

Definition statement

This place covers:

Access points. Equipment providing wireless coverage and selective access to/from wireless access network.

References

Limiting references

This place does not cover:

Transceivers, i.e. devices in which transmitter and receiver form a structural unit and in which at least one part is used for functions of transmitting and receiving	H04B 1/38
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Active relay systems	H04B 7/15
Cordless telephones	H04M 1/72
Casings, cabinets or drawers for electric apparatus	H05K 5/00
Constructional details common to different types of electric apparatus	H05K 7/00

H04W 88/085

{Access point devices with remote components}

Definition statement

This place covers:

Access point devices, where components of the access point device (e.g. transceiver and antenna) are located remote from the main body of the access point device, and the remote components are connected to the main body by cable, e.g. CATV or optical fibre.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Radio through fibre	H04B 10/2575
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H04W 88/10

adapted for operation in multiple networks, e.g. multi-mode access points

Definition statement

This place covers:

Access points able to operate using at least two networks, communication technologies or standards, or different versions of a standard, e.g. packet-switched and circuit-switched operation, analog-digital, WLAN-cellular, GSM900-GSM1800.

Access points with at least two operational modes.

H04W 88/12

Access point controller devices

Definition statement

This place covers:

Equipments for controlling access points, e.g. Base Station Controller (BSC), Radio Network Controller (RNC), Femto base station controller (Home nodeB gateway).

H04W 88/14

Backbone network devices

Definition statement

This place covers:

Backbone or core network devices. Switching or routing equipment for establishing a connection between a wireless user and a communication network, e.g. MSC/SGSN.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Data switching networks	H04L 12/00
Selecting	H04Q

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

MSC	Mobile Switching Centre
SGSN	Serving General Packet Radio Service Support Node

H04W 88/16

Gateway arrangements

Definition statement

This place covers:

Devices operating between different networks; Devices at the edge of one network interfacing to another network, e.g. between a wireless access network and a data network, or between a wireless access network and a wired network.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Inter-networking arrangements	H04W 92/02
Arrangements for connecting between networks having differing types of switching systems, e.g. gateways	H04L 12/66

H04W 88/18

Service support devices; Network management devices

Definition statement

This place covers:

- Wireless network equipments for providing services to users.
- Wireless network equipments for supporting the provision of services.

- Wireless network equipments for managing said networks.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Supervisory, monitoring or testing arrangements	H04W 24/00
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H04W 88/181

{Transcoding devices; Rate adaptation devices}

Definition statement

This place covers:

- Network equipment for providing direct digital-to-digital data conversion from one encoding to another.
- Network equipment for adapting the rate of a communication.
- Arrangements for avoiding multiple transcoding, e.g. for tandem free operation.

References

Limiting references

This place does not cover:

Speech or audio signal analysis-synthesis techniques for redundancy reduction, e.g. in vocoders; Coding or decoding of speech or audio signals, e.g. for compression or expansion, source-filter models or psychoacoustic analysis	G10L 19/00
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H04W 88/185

{Selective call encoders for paging networks, e.g. paging centre devices}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network addressing or numbering for mobility support	H04W 8/26
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H04W 92/00

Interfaces specially adapted for wireless communication networks

Definition statement

This place covers:

- Arrangements for interconnecting network components or networks.
- Special equipment or adaptations therefor.
- Control and signalling arrangements at an interface.

The following is a list of specific interfaces between entities defined by specific standards.

System/standard: entities/ Interface	Subgroups
GSM: BS-BSC/A-bis	H04W 92/04 , H04W 92/12
GSM: BSC-MSC/A	H04W 92/04 , H04W 92/14
UMTS: Node B- RNC/IuB	H04W 92/04 , H04W 92/12
UMTS: RNC-MGW/IuCS	H04W 92/04 , H04W 92/14
UMTS: RNC-SGSN/IuPS	H04W 92/04 , H04W 92/14
UMTS: USIM-ME/ Cu	H04W 92/08
UMTS: RNC-RNC/ IuR	H04W 92/22
GSM: HLR-MSC/ B	H04W 92/24
GSM: MSC/VLR-HLR/ D	H04W 92/24
GSM: MSC-EIR/ F	H04W 92/24
GPRS: EIR-SGSN/ Gf	H04W 92/24
GPRS: EIR-SGSN/ Gr	H04W 92/24
GPRS: EIR-SGSN/ Gc	H04W 92/24

Special rules of classification

Classification symbols of this group should preferably only be allocated as "additional information" in combination with at least one symbol of the functional groups [H04W 4/00](#) - [H04W 76/00](#).

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

GSM	Global System for Mobile communications
UMTS	Universal Mobile Telecommunications Systems
MSC	Mobile Switching Center
MGW	Media Gateway
SGSN	Serving GPRS Support Node
GPRS	General Packet Radio Service
ME	Mobile Equipment
EIR	Equipment Identity Register
USIM	Universal Subscriber Identity Module

H04W 92/02

Inter-networking arrangements

Definition statement

This place covers:

Arrangements for interconnecting a plurality of networks. The networks may be either physically or logically separated.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Gateway arrangements	H04W 88/16
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H04W 92/04

Interfaces between hierarchically different network devices

Definition statement

This place covers:

E.g. A-bis, IuB, A, IuCS, IuPS.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Leader-follower arrangements in self-organizing networks	H04W 84/20
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H04W 92/045

{between access point and backbone network device}

Definition statement

This place covers:

Interface between access point and switching/routing equipment of the network e.g. S1, S1U

H04W 92/06

between gateways and public network devices

Definition statement

This place covers:

Interface between the wireless network and edge equipment of a public fixed telephone or data network.

H04W 92/08

between user and terminal device

Definition statement

This place covers:

E.g. Cu. (the Cu-interface is the interface between the "SIM card" and the terminal; the Cu-interface may be wireless).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Mechanical arrangements for accommodating identification devices	H04B 1/3816
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H04W 92/10

between terminal device and access point, i.e. wireless air interface

References

Limiting references

This place does not cover:

Radio transmission systems for communication between two or more posts, at least one of which is mobile	H04B 7/26
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H04W 92/12

between access points and access point controllers

Definition statement

This place covers:

Interface between controlled access points and wireless access controlling equipment, e.g. A-bis, luB, luR, S1MME.

H04W 92/14

between access point controllers and backbone network device

Definition statement

This place covers:

Interface between BSC/RNC and switching/routing equipment of the network e.g. A, luCS, luPS, Gb, luH, S1MME.

H04W 92/16

Interfaces between hierarchically similar devices

Definition statement

This place covers:

E.g. among access points, between switching/routing equipments, between support/management equipments.

H04W 92/18**between terminal devices****Definition statement***This place covers:*

Interface between terminals/UEs of the network e.g. Device to Device (D2D), sidelink, PC5.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Direct-mode setup	H04W 76/14
Manipulation of direct-mode connections	H04W 76/23

H04W 92/20**between access points****Definition statement***This place covers:*

Interface between access points of the network e.g. X2

H04W 92/24**between backbone network devices****Definition statement***This place covers:*

Interface between switching/routing equipments and support/management equipment e.g. HLR, VLR, AuC, SMS-C; B, D, F, Gf, Gr, Gc].