

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H04 ELECTRIC COMMUNICATION TECHNIQUE

(NOTE omitted)

H04B TRANSMISSION

NOTE

This subclass covers the transmission of information-carrying signals, the transmission being independent of the nature of the information, and includes monitoring and testing arrangements and the suppression and limitation of noise and interference.

WARNING

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

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| 1/00 | Details of transmission systems, not covered by a single one of groups H04B 3/00 - H04B 13/00; Details of transmission systems not characterised by the medium used for transmission
NOTE
In this group, group H04B 1/0003 takes precedence over groups H04B 1/005 - H04B 1/76 | 1/0035 | . . . {Channel filtering, i.e. selecting a frequency channel within a software radio system (multiplexing of multicarrier modulation signals being represented by different frequencies H04L 5/06 ; multiplexing of multicarrier modulation signals H04L 5/023)} |
| 1/0003 | . {Software-defined radio [SDR] systems, i.e. systems wherein components typically implemented in hardware, e.g. filters or modulators/demodulators, are implented using software, e.g. by involving an AD or DA conversion stage such that at least part of the signal processing is performed in the digital domain (digital baseband systems H04L 25/00 ; digital modulation/demodulation H04L 27/00 ; CDMA H04B 1/707 ; TDMA H04B 7/2643 ; image transmission H04N 5/00)} | 1/0039 | . . . {using DSP [Digital Signal Processor] quadrature modulation and demodulation} |
| 1/0007 | . . {wherein the AD/DA conversion occurs at radiofrequency or intermediate frequency stage} | 1/0042 | . . . {Digital filtering (H04B 1/0035 takes precedence; digital filters per se H03H 17/00)} |
| 1/001 | . . . {Channel filtering, i.e. selecting a frequency channel within the SDR system (multiplexing of multicarrier modulation signals being represented by different frequencies H04L 5/06 ; multiplexing of multicarrier modulation signals H04L 5/023)} | 1/0046 | . . . {Decimation, i.e. data rate reduction techniques} |
| 1/0014 | . . . {using DSP [Digital Signal Processor] quadrature modulation and demodulation} | 1/005 | . {adapting radio receivers, transmitters and transceivers for operation on two or more bands, i.e. frequency ranges} |
| 1/0017 | . . . {Digital filtering (H04B 1/001 takes precedence; digital filters per se H03H 17/00)} | 1/0053 | . . {with common antenna for more than one band} |
| 1/0021 | . . . {Decimation, i.e. data rate reduction techniques (H04B 1/0025 takes precedence)} | 1/0057 | . . . {using diplexing or multiplexing filters for selecting the desired band} |
| 1/0025 | . . . {using a sampling rate lower than twice the highest frequency component of the sampled signal (for demodulation of angle-modulated signals H03D 3/006)} | 1/006 | . . . {using switches for selecting the desired band (H04B 1/0057 takes precedence)} |
| 1/0028 | . . {wherein the AD/DA conversion occurs at baseband stage} | 1/0064 | . . {with separate antennas for the more than one band (H04B 1/0053 takes precedence)} |
| 1/0032 | . . . {with analogue quadrature frequency conversion to and from the baseband (quadrature modulators and demodulators per se H03D 3/007 , H03C 3/40)} | 1/0067 | . . {with one or more circuit blocks in common for different bands} |
| | | 1/0071 | . . . {using a common intermediate frequency for more than one band (H04B 1/0075 takes precedence)} |
| | | 1/0075 | . . . {using different intermediate frequencied for the different bands} |
| | | 1/0078 | {with a common intermediate frequency amplifier for the different intermediate frequencies, e.g. when using switched intermediate frequency filters} |
| | | 1/0082 | . . . {with a common local oscillator for more than one band} |
| | | 1/0085 | {where one band is the image frequency band of the other and the band selection is done by image rejection} |
| | | 1/0089 | {using a first intermediate frequency higher than the highest of any band received} |
| | | 1/0092 | {using a wideband front end} |
| | | 1/0096 | . . {where a full band is frequency converted into another full band} |

1/02	. Transmitters	1/126	. . . . . {having multiple inputs, e.g. auxiliary antenna for receiving interfering signal (aerials in general H01Q)}
1/03	. . Constructional details, e.g. casings, housings	1/14	. . . Automatic detuning arrangements
1/034	. . . Portable transmitters	1/16	. . Circuits
1/0343	. . . . {to be carried on the body}	1/1607	. . . {Supply circuits (converters H02M ; filters therefor H02M 1/14 ; voltage stabilisers G05F 1/46)}
1/0346	. . . . {Hand-held transmitters}	1/1615	. . . . {Switching on; Switching off, e.g. remotely (battery saving circuits associated with selective call operation H04W 52/00 ; details of power consumption reduction in a PLL, H03L 7/0802 , H03L 7/14 , H03L 2207/08 , H03L 2207/18 ; muting amplifiers by gain control see H03G 3/34)}
1/036	. . . Cooling arrangements	1/1623	. . . . {using tubes}
1/04	. . Circuits	1/163	. . . {Special arrangements for the reduction of the damping of resonant circuits of receivers (amplifiers H03F ; negative impedance networks for line transmission systems H04B 3/16)}
2001/0408	. . . {with power amplifiers}	1/1638	. . . {Special circuits to enhance selectivity of receivers not otherwise provided for (resonant circuits H03H)}
2001/0416	. . . . {having gain or transmission power control}	1/1646	. . . {adapted for the reception of stereophonic signals}
2001/0425	. . . . {with linearisation using predistortion}	1/1653	. . . . {Detection of the presence of stereo signals and pilot signal regeneration}
2001/0433	. . . . {with linearisation using feedback}	1/1661	. . . . {Reduction of noise by manipulation of the baseband composite stereophonic signal or the decoded left and right channels}
2001/0441	. . . . {with linearisation using feed-forward}	1/1669	. . . . . {of the demodulated composite stereo signal}
2001/045	. . . . {with means for improving efficiency}	1/1676	. . . . . {of the sum or difference signal}
1/0458	. . . {Arrangements for matching and coupling between power amplifier and antenna or between amplifying stages (matching circuits in general H03H)}	1/1684	. . . . . {of the decoded left or right stereo channel}
1/0466	. . . {Fault detection or indication (H04B 1/0483 takes precedence)}	1/1692	. . . . {using companding of the stereo difference signal, e.g. FMX (volume compression or expansion in amplifiers H03G 7/00)}
1/0475	. . . {with means for limiting noise, interference or distortion (H04B 1/0483 takes precedence)}	1/18	. . . Input circuits, e.g. for coupling to an antenna or a transmission line (coupling networks between antennas or lines and receivers independent of the nature of the receiver H03H)
1/0483	. . . {Transmitters with multiple parallel paths}	1/20	. . . for coupling gramophone pick-up, recorder output, or microphone to receiver
2001/0491	. . . {with frequency synthesizers, frequency converters or modulators}	1/202	. . . . {by remote control}
1/06	. Receivers	1/205	. . . . {with control bus for exchanging commands between units}
1/08	. . Constructional details, e.g. cabinet	1/207	. . . . {with an audio or audio/video bus for signal distribution (H04B 1/205 takes precedence)}
1/082	. . . {to be used in vehicles (H04B 1/086 takes precedence; holding or mounting accessories B60R 11/02)}	1/22	. . . for receivers in which no local oscillation is generated
2001/084	. . . . {with removable front panel}	1/24	. . . . the receiver comprising at least one semiconductor device having three or more electrodes
1/086	. . . {Portable receivers}	1/26	. . . for superheterodyne receivers (multiple frequency-changing H03D 7/16)
1/088	. . . . {with parts of the receiver detachable or collapsible}	1/28	. . . . the receiver comprising at least one semiconductor device having three or more electrodes
1/10	. . Means associated with receiver for limiting or suppressing noise or interference	1/30	. . . for homodyne or synchrodyne receivers (demodulator circuits H03D 1/22)
1/1009	. . . {Placing the antenna at a place where the noise level is low and using a noise-free transmission line between the antenna and the receivers (screened aerials H01Q 7/04 ; feeders for aerials H01Q 9/00)}	1/302	. . . . {for single sideband receivers (demodulator circuits H03D 1/24)}
1/1018	. . . {noise filters connected between the power supply and the receiver}		
1/1027	. . . {assessing signal quality or detecting noise/interference for the received signal}		
1/1036	. . . . {with automatic suppression of narrow band noise or interference, e.g. by using tuneable notch filters (H04B 1/123 takes precedence; filter circuits H03H)}		
2001/1045	. . . . {Adjacent-channel interference}		
2001/1054	. . . . {by changing bandwidth}		
2001/1063	. . . . {using a notch filter}		
2001/1072	. . . . {by tuning the receiver frequency}		
1/1081	. . . {Reduction of multipath noise (by equalising H04B 7/005)}		
1/109	. . . {by improving strong signal performance of the receiver when strong unwanted signals are present at the receiver input}		
1/12	. . . Neutralising, balancing, or compensation arrangements		
1/123	. . . . {using adaptive balancing or compensation means (adaptive filter circuits and algorithms H03H)}		

2001/305	. . . . {using DC offset compensation techniques}	1/403	. . . using the same oscillator for generating both the transmitter frequency and the receiver local oscillator frequency
2001/307	. . . . {using n-port mixer}	1/405	. . . . with multiple discrete channels
1/38	. 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	1/406	. . . . {with more than one transmission mode, e.g. analog and digital modes}
1/3805	. . with built-in auxiliary receivers	1/408	. . . . the transmitter oscillator frequency being identical to the receiver local oscillator frequency
2001/3811	. . . {Split configuration of transmission devices}	1/44	. . . Transmit/receive switching
1/3816	. . Mechanical arrangements for accommodating identification devices, e.g. cards or chips; with connectors for programming identification devices	1/46	. . . . by voice-frequency signals; by pilot signals
1/3818	. . . Arrangements for facilitating insertion or removal of identification devices	1/48	. . . . in circuits for connecting transmitter and receiver to a common transmission path, e.g. by energy of transmitter { (H04B 1/46 takes precedence) }
1/3822	. . specially adapted for use in vehicles (H04B 1/3827 takes precedence)	2001/485	. . . . . {inhibiting unwanted transmission}
1/3827	. . Portable transceivers	1/50	. . . using different frequencies for the two directions of communication
1/3833	. . . {Hand-held transceivers}	1/52	. . . . Hybrid arrangements, i.e. arrangements for transition from single-path two-direction transmission to single-direction transmission on each of two paths or vice versa
1/3838	. . . . {Arrangements for reducing RF exposure to the user, e.g. by changing the shape of the transceiver while in use}	1/525	. . . . . with means for reducing leakage of transmitter signal into the receiver
2001/3844	. . . . . {with means to alert the user that a certain exposure has been reached}	1/54	. . . using the same frequency for two directions of communication (H04B 1/44 takes precedence)
1/385	. . . {Transceivers carried on the body, e.g. in helmets}	1/56	. . . . with provision for simultaneous communication in two directions
2001/3855	. . . . {carried in a belt or harness}	1/58	. . . . Hybrid arrangements, i.e. arrangements for transition from single-path two-direction transmission to single-direction transmission on each of two paths or vice versa
WARNING		1/581	. . . . . {using a transformer}
Group H04B 2001/3855 is impacted by reclassification into group A45F 5/1516 .		1/582	. . . . . {with automatic balancing}
Groups H04B 2001/3855 and A45F 5/1516 should be considered in order to perform a complete search.		1/583	. . . . . {using a bridge network}
2001/3861	. . . . {carried in a hand or on fingers}	1/585	. . . . . {with automatic balancing}
WARNING		1/586	. . . . . {using an electronic circuit}
Group H04B 2001/3861 is impacted by reclassification into group A45F 5/1516 .		1/587	. . . . . {using opto-couplers (light transmission systems H04B 10/00)}
Groups H04B 2001/3861 and A45F 5/1516 should be considered in order to perform a complete search.		1/588	. . . . . {using sampling gates}
2001/3866	. . . . {carried on the head}	1/59	. Responders; Transponders
2001/3872	. . . . {with extendable microphones or earphones}	1/60	. Supervising unattended repeaters
1/3877	. . . Arrangements for enabling portable transceivers to be used in a fixed position, e.g. cradles or boosters	1/62	. for providing a predistortion of the signal in the transmitter and corresponding correction in the receiver, e.g. for improving the signal/noise ratio
1/3883	. . . Arrangements for mounting batteries or battery chargers	1/64	. . Volume compression or expansion arrangements
1/3888	. . . Arrangements for carrying or protecting transceivers	1/66	. for reducing bandwidth of signals; for improving efficiency of transmission (H04B 1/68 takes precedence)
WARNING		1/662	. . {using a time/frequency relationship, e.g. time compression or expansion}
Group H04B 1/3888 is impacted by reclassification into groups A45C 11/002 , A45C 11/003 , G06F 1/1629 and H04M 1/0203 .		1/665	. . {using psychoacoustic properties of the ear, e.g. masking effect}
All groups listed in this Warning should be considered in order to perform a complete search.		1/667	. . {using a division in frequency subbands (for TV signals H04N 19/63)}
2001/3894	. . {Waterproofing of transmission device}	1/68	. for wholly or partially suppressing the carrier or one side band
1/40	. . Circuits	1/69	. Spread spectrum techniques
1/401	. . . for selecting or indicating operating mode	2001/6904	. . {using code hopping}
		2001/6908	. . {using time hopping}
		2001/6912	. . {using chirp}
		2001/6916	. . {Related theory}
		1/692	. . Hybrid techniques using combinations of two or more spread spectrum techniques

1/707	. . . using direct sequence modulation	1/7113	. . . . . Determination of path profile
2001/70706	. . . {using a code tracking loop, e.g. a delay locked loop}	1/7115	. . . . . Constructive combining of multi-path signals, i.e. RAKE receivers
1/70712	. . . {with demodulation by means of convolvers, e.g. of the SAW type (SAW convolvers in general G06G 7/195)}	1/7117	. . . . . Selection, re-selection, allocation or re-allocation of paths to fingers, e.g. timing offset control of allocated fingers
1/70718	. . . {with asynchronous demodulation, i.e. not requiring code synchronisation}	1/712	. . . . . Weighting of fingers for combining, e.g. amplitude control or phase rotation using an inner loop
2001/70724	. . . {featuring pilot assisted reception}	1/713	. . . using frequency hopping
1/7073	. . . Synchronisation aspects	1/7136	. . . Arrangements for generation of hop frequencies, e.g. using a bank of frequency sources, using continuous tuning or using a transform
1/70735	. . . {Code identification (H04B 1/7083 takes precedence)}	2001/71362	. . . . {using a bank of frequency sources}
1/7075	. . . . with code phase acquisition	2001/71365	. . . . {using continuous tuning of a single frequency source}
1/70751	. . . . {using partial detection (H04B 1/70758 takes precedence)}	2001/71367	. . . . {using a transform}
1/70752	. . . . . {Partial correlation}	1/7143	. . . Arrangements for generation of hop patterns
1/70753	. . . . . {Partial phase search}	1/715	. . . Interference-related aspects
1/70754	. . . . . {Setting of search window, i.e. range of code offsets to be searched (H04B 1/70758 takes precedence)}	2001/7152	. . . . {with means for suppressing interference}
1/70755	. . . . . {Setting of lock conditions, e.g. threshold}	2001/7154	. . . . {with means for preventing interference}
1/70756	. . . . . {Jumping within the code, i.e. masking or slewing (H04B 1/70758 takes precedence)}	1/7156	. . . Arrangements for sequence synchronisation
1/70757	. . . . . {with increased resolution, i.e. higher than half a chip (H04B 1/70758 takes precedence)}	2001/71563	. . . . {Acquisition}
1/70758	. . . . . {Multimode search, i.e. using multiple search strategies}	2001/71566	. . . . {Tracking}
1/7077	. . . . . Multi-step acquisition, e.g. multi-dwell, coarse-fine or validation	1/7163	. . . using impulse radio
1/70775	. . . . . {Multi-dwell schemes, i.e. multiple accumulation times}	1/71632	. . . {Signal aspects (H04B 1/7172 and H04B 1/7176 take precedence)}
1/708	. . . . . Parallel implementation	1/71635	. . . {Transmitter aspects (H04B 1/7174 takes precedence)}
1/7083	. . . . Cell search, e.g. using a three-step approach	1/71637	. . . {Receiver aspects (H04B 1/7183 takes precedence)}
1/7085	. . . . using a code tracking loop, e.g. a delay-locked loop	1/717	. . . Pulse-related aspects
2001/70855	. . . . . {Dithering}	1/7172	. . . . {Pulse shape (in general H04L 25/03834)}
1/7087	. . . . Carrier synchronisation aspects	1/7174	. . . . {Pulse generation (in general H04L 25/03834)}
1/709	. . . Correlator structure	1/7176	. . . Data mapping, e.g. modulation
1/7093	. . . . Matched filter type	1/7183	. . . Synchronisation
2001/70935	. . . . {using a bank of matched filters, e.g. Fast Hadamard Transform}	1/719	. . . Interference-related aspects
1/7095	. . . . Sliding correlator type	1/72	. . . Circuits or components for simulating antennas, e.g. dummy antennas
1/7097	. . . Interference-related aspects	1/74	. . . for increasing reliability, e.g. using redundant or spare channels or apparatus {(replacing by standby devices for amplifiers H03F 1/52 , H03F 1/542)}
1/71	. . . . the interference being narrowband interference	1/745	. . . {using by-passing or self-healing methods}
1/7101	. . . . . {with estimation filters}	1/76	. . . Pilot transmitters or receivers for control of transmission or for equalising
1/7102	. . . . . {with transform to frequency domain}	3/00	Line transmission systems (combined with near-field transmission systems H04B 5/00)
1/7103	. . . . the interference being multiple access interference	3/02	. . . Details
1/7105	. . . . . Joint detection techniques, e.g. linear detectors	3/03	. . . Hybrid circuits (for transceivers H04B 1/52, H04B 1/58)
1/71052	. . . . . {using decorrelation matrix}	3/04	. . . Control of transmission; Equalising
1/71055	. . . . . {using minimum mean squared error [MMSE] detector}	3/06	. . . by the transmitted signal
1/71057	. . . . . {using maximum-likelihood sequence estimation [MLSE]}	3/08	. . . . in negative-feedback path of line amplifier
1/7107	. . . . . Subtractive interference cancellation	3/10	. . . by pilot signal
1/71072	. . . . . {Successive interference cancellation}	3/11	. . . . using pilot wire (H04B 3/12 takes precedence)
1/71075	. . . . . {Parallel interference cancellation}	3/12	. . . . in negative-feedback path of line amplifier
2001/71077	. . . . . {Partial interference cancellation}	3/14	. . . characterised by the equalising network used
1/711	. . . . the interference being multi-path interference	3/141	. . . . {using multiequalisers, e.g. bump, cosine, Bode}

- 3/142 {using echo-equalisers, e.g. transversal}
- 3/143 {using amplitude-frequency equalisers}
- 3/144 {fixed equalizers}
- 3/145 {variable equalisers}
- 3/146 {using phase-frequency equalisers}
- 3/147 {fixed equalisers}
- 3/148 {variable equalisers}
- 3/16 . . . characterised by the negative-impedance network used
- 3/18 wherein the network comprises semiconductor devices
- 3/20 . . Reducing echo effects or singing; Opening or closing transmitting path; Conditioning for transmission in one direction or the other
- 3/21 . . . using a set of bandfilters
- 3/23 . . . using a replica of transmitted signal in the time domain, e.g. echo cancellers
- 3/231 {Echo cancellers using readout of a memory to provide the echo replica}
- 3/232 {using phase shift, phase roll or frequency offset correction}
- 3/234 {using double talk detection}
- 3/235 {combined with adaptive equaliser}
- 3/237 {using two adaptive filters, e.g. for near end and for end echo cancelling}
- 3/238 {using initial training sequence}
- 3/26 . . Improving frequency characteristic by the use of loading coils
- 3/28 . . Reducing interference caused by currents induced in cable sheathing or armouring
- 3/30 . . Reducing interference caused by unbalanced currents in a normally balanced line
- 3/32 . . Reducing cross-talk, e.g. by compensating
- 3/34 . . . by systematic interconnection of lengths of cable during laying; by addition of balancing components to cable during laying
- 3/36 . . Repeater circuits ([H04B 3/58 takes precedence](#))
- 3/38 . . . for signals in two different frequency ranges transmitted in opposite directions over the same transmission path
- 3/40 . . Artificial lines; Networks simulating a line of certain length
- 3/42 . . Circuits for by-passing of ringing signals
- 3/44 . . Arrangements for feeding power to a repeater along the transmission line
- 3/46 . . Monitoring; Testing
- 3/462 . . . Testing group delay or phase shift, e.g. timing jitter
- 3/466 Testing attenuation in combination with at least one of group delay and phase shift
- 3/48 . . . Testing attenuation ([H04B 3/466 takes precedence](#))
- 3/487 . . . Testing crosstalk effects
- 3/493 . . . Testing echo effects or singing
- 3/50 . . Systems for transmission between fixed stations via two-conductor transmission lines ([H04B 3/54 takes precedence](#))
- 3/52 . . Systems for transmission between fixed stations via waveguides
- 3/54 . . Systems for transmission via power distribution lines
- 3/542 . . {the information being in digital form}
- 3/544 . . {Setting up communications; Call and signalling arrangements}
- 3/546 . . {Combination of signalling, telemetering, protection (circuits for remote indication of supply or distribution network condition [H02J 13/00](#))}
- 3/548 . . {the power on the line being DC (arrangements for feeding power [H04L 12/10](#); extracting feeding power from signals [H04L 25/02](#))}
- 3/56 . . Circuits for coupling, blocking, or by-passing of signals
- 3/58 . . Repeater circuits
- 3/60 . . Systems for communication between relatively movable stations, e.g. for communication with lift ([H04B 3/54 takes precedence](#))
- 5/00 Near-field transmission systems, e.g. inductive or capacitive transmission systems**
- WARNING**
Group [H04B 5/00](#) is impacted by reclassification into groups [H04B 5/40](#), [H04B 5/43](#) and [H04B 5/45](#).
All groups listed in this Warning should be considered in order to perform a complete search.
- 5/20 . . characterised by the transmission technique; characterised by the transmission medium
- WARNING**
Groups [H04B 5/20](#), [H04B 5/22](#), [H04B 5/24](#), [H04B 5/26](#), [H04B 5/263](#), [H04B 5/266](#) and [H04B 5/28](#) are incomplete pending reclassification of documents from group [H04B 5/72](#).
All groups listed in this Warning should be considered in order to perform a complete search.
- 5/22 . . Capacitive coupling
- 5/24 . . Inductive coupling
- 5/26 . . . using coils
- 5/263 {Multiple coils at either side}
- 5/266 {One coil at each side, e.g. with primary and secondary coils}
- 5/28 . . using the near field of leaky cables, e.g. of leaky coaxial cables
- 5/40 . . characterised by components specially adapted for near-field transmission
- WARNING**
Groups [H04B 5/40](#) and [H04B 5/43](#) are incomplete pending reclassification of documents from group [H04B 5/00](#).
Groups [H04B 5/00](#), [H04B 5/40](#) and [H04B 5/43](#) should be considered in order to perform a complete search.
- 5/43 . . Antennas

5/45	. . Transponders	7/0421	. . . . . {utilizing implicit feedback, e.g. steered pilot signals}
	WARNING	7/0426	. . . . . Power distribution
	Group H04B 5/45 is incomplete pending reclassification of documents from groups H04B 5/00 and H04B 5/72 .	7/043	. . . . . {using best eigenmode, e.g. beam forming or beam steering}
	Groups H04B 5/00 , H04B 5/72 and H04B 5/45 should be considered in order to perform a complete search.	7/0434	. . . . . {using multiple eigenmodes}
5/48	. . Transceivers	7/0439	. . . . . {utilizing channel inversion}
5/70	. specially adapted for specific purposes	7/0443	. . . . . {utilizing "waterfilling" technique}
	WARNING	7/0447	. . . . . {utilizing uniform distribution}
	Group H04B 5/70 is incomplete pending reclassification of documents from group H04B 5/72 .	7/0452	. . . . . Multi-user MIMO systems
	Groups H04B 5/72 and H04B 5/70 should be considered in order to perform a complete search.	7/0456	. . . . . Selection of precoding matrices or codebooks, e.g. using matrices antenna weighting
5/72	. . for local intradevice communication	7/046	. . . . . {taking physical layer constraints into account}
	WARNING	7/0465	. . . . . {taking power constraints at power amplifier or emission constraints, e.g. constant modulus, into account}
	Group H04B 5/72 is impacted by reclassification into groups H04B 5/20 , H04B 5/22 , H04B 5/24 , H04B 5/26 , H04B 5/263 , H04B 5/266 , H04B 5/28 , H04B 5/45 and H04B 5/70 .	7/0469	. . . . . {taking special antenna structures, e.g. cross polarized antennas into account}
	All groups listed in this Warning should be considered in order to perform a complete search.	7/0473	. . . . . {taking constraints in layer or codeword to antenna mapping into account}
5/73	. . for taking measurements, e.g. using sensing coils	7/0478	. . . . . {Special codebook structures directed to feedback optimisation}
5/75	. . for isolation purposes	7/0479	. . . . . {for multi-dimensional arrays, e.g. horizontal or vertical pre-distortion matrix index [PMI]}
5/77	. . for interrogation	7/048	. . . . . {using three or more PMIs}
5/79	. . for data transfer in combination with power transfer	7/0481	. . . . . {using subset selection of codebooks}
7/00	Radio transmission systems, i.e. using radiation field (H04B 10/00, H04B 15/00 take precedence)	7/0482	. . . . . {Adaptive codebooks}
7/002	. {Reducing depolarization effects}	7/0486	. . . . . {taking channel rank into account}
7/005	. Control of transmission; Equalising	7/0487	. . . . . {Codebooks having a nested structure}
7/01	. Reducing phase shift	7/0491	. . . . . using two or more sectors, i.e. sector diversity
7/015	. Reducing echo effects	7/0495	. . . . . using overlapping sectors in the same base station to implement MIMO for antennas
7/02	. Diversity systems; Multi-antenna system, i.e. transmission or reception using multiple antennas (RAKE receivers H04B 1/7115)	7/06	. . . . . at the transmitting station
7/022	. . Site diversity; Macro-diversity (using two or more spaced independent antennas H04B 7/04)	7/0602	. . . . . {using antenna switching (H04B 7/0686 takes precedence; antenna beam directivity switching H01Q 3/24)}
7/024	. . . Co-operative use of antennas of several sites, e.g. in co-ordinated multipoint or co-operative multiple-input multiple-output [MIMO] systems	7/0604	. . . . . {with predefined switching scheme}
7/026	. . . Co-operative diversity, e.g. using fixed or mobile stations as relays	7/0606	. . . . . {Random or pseudo-random switching scheme}
7/028	. . {Spatial transmit diversity using a single antenna at the transmitter}	7/0608	. . . . . {Antenna selection according to transmission parameters}
7/04	. . using two or more spaced independent antennas	7/061	. . . . . {using feedback from receiving side}
7/04013	. . . {Intelligent reflective surfaces}	7/0613	. . . . . {using simultaneous transmission (H04B 7/0686 takes precedence)}
7/04026	. . . . {with codebook-based beamforming}	7/0615	. . . . . {of weighted versions of same signal}
7/0404	. . . the mobile station comprising multiple antennas, e.g. to provide uplink diversity	7/0617	. . . . . {for beam forming}
7/0408	. . . using two or more beams, i.e. beam diversity	7/0619	. . . . . {using feedback from receiving side (feedback signaling for adaptive modulation/coding H04L 1/0001)}
7/0413	. . . MIMO systems	7/0621	. . . . . {Feedback content}
7/0417	. . . Feedback systems	7/0623	. . . . . {Auxiliary parameters, e.g. power control [PCB] or not acknowledged commands [NACK], used as feedback information}
		7/0626	. . . . . {Channel coefficients, e.g. channel state information [CSI]}
		7/0628	. . . . . {Diversity capabilities}

7/063	. . . . .	{Parameters other than those covered in groups H04B 7/0623 - H04B 7/0634 , e.g. channel matrix rank or transmit mode selection}	7/06954	. . . . .	{Sidelink beam training with support from third instance, e.g. the third instance being a base station}
7/0632	. . . . .	{Channel quality parameters, e.g. channel quality indicator [CQI]}	7/06956	. . . . .	{using a selection of antenna panels}
7/0634	. . . . .	{Antenna weights or vector/matrix coefficients}	7/06958	. . . . .	{Multistage beam selection, e.g. beam refinement}
7/0636	. . . . .	{Feedback format}	7/0696	. . . . .	{Determining beam pairs}
7/0639	. . . . .	{Using selective indices, e.g. of a codebook, e.g. pre-distortion matrix index [PMI] or for beam selection}	7/06962	. . . . .	{Simultaneous selection of transmit [Tx] and receive [Rx] beams at both sides of a link}
7/0641	. . . . .	{Differential feedback}	7/06964	. . . . .	{Re-selection of one or more beams after beam failure}
7/0643	. . . . .	{Feedback on request}	7/06966	. . . . .	{using beam correspondence; using channel reciprocity, e.g. downlink beam training based on uplink sounding reference signal [SRS]}
7/0645	. . . . .	{Variable feedback}	7/06968	. . . . .	{using quasi-colocation [QCL] between signals}
7/0647	. . . . .	{Variable feedback rate}	7/0697	. . . .	{using spatial multiplexing}
7/065	. . . . .	{Variable contents, e.g. long-term or short-short}	7/08	. . .	at the receiving station
7/0652	. . . . .	{Feedback error handling}	7/0802	. . . .	{using antenna selection (H04B 7/0868 takes precedence; antenna beam directivity switching H01Q 3/24)}
7/0654	. . . . .	{at the receiver, e.g. antenna verification at mobile station}	7/0805	. . . . .	{with single receiver and antenna switching (H04B 7/0822 takes precedence)}
7/0656	. . . . .	{at the transmitter, e.g. error detection at base station}	7/0808	. . . . .	{comparing all antennas before reception}
7/0658	. . . . .	{Feedback reduction}	7/0811	. . . . .	{during preamble or gap period}
7/066	. . . . .	{Combined feedback for a number of channels, e.g. over several subcarriers like in orthogonal frequency division multiplexing [OFDM]}	7/0814	. . . . .	{based on current reception conditions, e.g. switching to different antenna when signal level is below threshold}
7/0663	. . . . .	{using vector or matrix manipulations}	7/0817	. . . . .	{with multiple receivers and antenna path selection}
7/0665	. . . . .	{Feed forward of transmit weights to the receiver}	7/082	. . . . .	{selecting best antenna path}
7/0667	. . . . .	{of delayed versions of same signal (using space-time coding H04L 1/0618)}	7/0822	. . . . .	{according to predefined selection scheme}
7/0669	. . . . .	{using different channel coding between antennas (space-time coding H04L 1/0618)}	7/0825	. . . . .	{with main and with auxiliary or diversity antennas}
7/0671	. . . . .	{using different delays between antennas}	7/0828	. . . . .	{with delay elements in antenna paths}
7/0673	. . . . .	{using feedback from receiving side}	7/0831	. . . . .	{Compensation of the diversity switching process for non-uniform properties or faulty operations of the switches used in the diversity switching process}
7/0676	. . . . .	{using random or pseudo-random delays}	7/0834	. . . . .	{based on external parameters, e.g. subscriber speed or location}
7/0678	. . . . .	{using different spreading codes between antennas (code allocation H04J 13/16)}	7/0837	. . . . .	{using pre-detection combining (H04B 7/0868 takes precedence)}
7/068	. . . . .	{using space frequency diversity (space-frequency coding H04L 1/0606)}	7/084	. . . . .	{Equal gain combining, only phase adjustments (antenna beam scanning or forming by phase or amplitude control H01Q 3/26 , e.g. phased arrays)}
7/0682	. . . . .	{using phase diversity (e.g. phase sweeping)}	7/0842	. . . . .	{Weighted combining}
7/0684	. . . . .	{using different training sequences per antenna}	7/0845	. . . . .	{per branch equalization, e.g. by an FIR-filter or RAKE receiver per antenna branch (rake receivers as such H04B 1/7115)}
7/0686	. . . . .	{Hybrid systems, i.e. switching and simultaneous transmission}	7/0848	. . . . .	{Joint weighting}
7/0689	. . . . .	{using different transmission schemes, at least one of them being a diversity transmission scheme}	7/0851	. . . . .	{using training sequences or error signal (minimizing error signal H04B 7/0854)}
7/0691	. . . . .	{using subgroups of transmit antennas}			
7/0693	. . . . .	{switching off a diversity branch, e.g. to save power}			
7/0695	. . . . .	{using beam selection}			
7/06952	. . . . .	{Selecting one or more beams from a plurality of beams, e.g. beam training, management or sweeping}			

7/0854	. . . . .	{using error minimizing algorithms, e.g. minimum mean squared error [MMSE], "cross-correlation" or matrix inversion}	7/15528	. . . . .	{Control of operation parameters of a relay station to exploit the physical medium}
7/0857	. . . . .	{using maximum ratio combining techniques, e.g. signal-to-interference ratio [SIR], received signal strength indication [RSS]}	7/15535	. . . . .	{Control of relay amplifier gain (amplifier gain control in general H03G 3/00 ; gain control reducing self- or loop interference H04B 7/15578)}
7/086	. . . . .	{using weights depending on external parameters, e.g. direction of arrival [DOA], predetermined weights or beamforming}	7/15542	. . . . .	{Selecting at relay station its transmit and receive resources (selection of wireless resources by user or terminal H04W 72/02 ; arrangements affording multiple use of the transmission path by two-dimensional division of the resources H04L 5/0003 , or by allocating sub-channels H04L 5/003)}
7/0862	. . . . .	{receiver computing weights based on information from the transmitter}	7/1555	. . . . .	{Selecting relay station antenna mode, e.g. selecting omnidirectional -, directional beams, selecting polarizations}
7/0865	. . . . .	{Independent weighting, i.e. weights based on own antenna reception parameters}	7/15557	. . . . .	{Selecting relay station operation mode, e.g. between amplify and forward mode, decode and forward mode or FDD - and TDD mode}
7/0868	. . . . .	{Hybrid systems, i.e. switching and combining}	7/15564	. . . . .	{Relay station antennae loop interference reduction}
7/0871	. . . . .	{using different reception schemes, at least one of them being a diversity reception scheme}	7/15571	. . . . .	{by signal isolation, e.g. isolation by frequency or by antenna pattern, or by polarization}
7/0874	. . . . .	{using subgroups of receive antennas}	7/15578	. . . . .	{by gain adjustment}
7/0877	. . . . .	{switching off a diversity branch, e.g. to save power}	7/15585	. . . . .	{by interference cancellation}
7/088	. . . . .	{using beam selection}	7/15592	. . . . .	{Adapting at the relay station communication parameters for supporting cooperative relaying, i.e. transmission of the same data via direct - and relayed path (cooperative diversity H04B 7/024)}
7/0882	. . . . .	{using post-detection diversity}	7/165	. . . . .	employing angle modulation
7/0885	. . . . .	{with combination}	7/17	. . . . .	employing pulse modulation, e.g. pulse code modulation
7/0888	. . . . .	{with selection}	7/185	. . . . .	Space-based or airborne stations; {Stations for satellite systems} (H04B 7/204 takes precedence)
7/0891	. . . . .	{Space-time diversity (rake receivers H04B 1/7115 ; space-time decoding H04L 1/0631)}	7/18502	. . . . .	{Airborne stations}
7/0894	. . . . .	{using different delays between antennas}	7/18504	. . . . .	{Aircraft used as relay or high altitude atmospheric platform}
7/0897	. . . . .	{using beamforming per multi-path, e.g. to cope with different directions of arrival [DOA] at different multi-paths}	7/18506	. . . . .	{Communications with or from aircraft, i.e. aeronautical mobile service}
7/10	. . . . .	Polarisation diversity; Directional diversity	7/18508	. . . . .	{with satellite system used as relay, i.e. aeronautical mobile satellite service}
7/12	. . . . .	Frequency diversity	7/1851	. . . . .	{Systems using a satellite or space-based relay (H04B 7/18508 , H04B 7/18521 take precedence; providing specific services H04B 7/18523 - H04B 7/18576)}
7/14	. . . . .	Relay systems	7/18513	. . . . .	{Transmission in a satellite or space-based system}
7/145	. . . . .	Passive relay systems	7/18515	. . . . .	{Transmission equipment in satellites or space-based relays}
7/15	. . . . .	Active relay systems	7/18517	. . . . .	{Transmission equipment in earth stations}
7/155	. . . . .	Ground-based stations (H04B 7/204 takes precedence)	7/18519	. . . . .	{Operations control, administration or maintenance}
7/15507	. . . . .	{Relay station based processing for cell extension or control of coverage area, (network planning with network coordinated processing with regard to cell extension H04W 16/26 ; network topologies using dedicated repeater stations H04W 84/047 ; terminal devices adapted for relaying to or from an other terminal H04W 88/04)}	7/18521	. . . . .	{Systems of inter linked satellites, i.e. inter satellite service (for optical links between satellites H04B 10/118)}
7/15514	. . . . .	{for shadowing compensation (for satellite mobile telephony service systems H04B 7/18536)}			
7/15521	. . . . .	{combining by calculations packets received from different stations before transmitting the combined packets as part of network coding (network coding aspects for detection or prevention of errors in the information received H04L 1/0076 ; network traffic management with optimizing of information sizing, e.g. header compression, by using assembly and disassembly of packets H04W 28/065)}			

- 7/18523 {Satellite systems for providing broadcast service to terrestrial stations, i.e. broadcast satellite service ([arrangements specially adapted for satellite broadcast receiving H04H 40/90](#); picture transmission via satellite [H04N 1/00103](#); television transmission via satellite [H04N 7/20](#))}
- 7/18526 {Arrangements for data linking, networking or transporting, or for controlling an end to end session ([data switching networks H04L 12/00](#))}
- 7/18528 {Satellite systems for providing two-way communications service to a network of fixed stations, i.e. fixed satellite service or very small aperture terminal [VSAT] system}
- 7/1853 {Satellite systems for providing telephony service to a mobile station, i.e. mobile satellite service ([for selecting H04W](#))}
- 7/18532 {Arrangements for managing transmission, i.e. for transporting data or a signalling message}
- 7/18534 {for enhancing link reliability, e.g. satellites diversity}
- 7/18536 {Shadowing compensation therefor, e.g. by using an additional terrestrial relay}
- 7/18539 {Arrangements for managing radio, resources, i.e. for establishing or releasing a connection}
- 7/18541 {for handover of resources}
- 7/18543 {for adaptation of transmission parameters, e.g. power control ([for detecting or preventing errors in the information received H04L 1/00](#))}
- 7/18545 {Arrangements for managing station mobility, i.e. for station registration or localisation}
- 7/18547 {for geolocalisation of a station ([position fixing by direction or distance determination G01S 5/00](#))}
- 7/1855 {using a telephonic control signal, e.g. propagation delay variation, Doppler frequency variation, power variation, beam identification}
- 7/18552 {using a telephonic control signal and a second ranging satellite ([determining absolute distances from a plurality of spaced points of known location G01S 5/14](#))}
- 7/18554 {using the position provided by an existing geolocalisation system}
- 7/18556 {using a location database}
- 7/18558 {Arrangements for managing communications, i.e. for setting up, maintaining or releasing a call between stations}
- 7/1856 {for call routing}
- 7/18563 {Arrangements for interconnecting multiple systems ([data switching networks H04L 12/00](#))}
- 7/18565 {Arrangements for preventing unauthorised access or for providing user protection ([arrangements for secret or secure communication H04L 9/00](#))}
- 7/18567 {Arrangements for providing additional services to the basic mobile satellite telephony service}
- 7/18569 {Arrangements for system physical machines management, i.e. for construction operations control, administration, maintenance}
- 7/18571 {for satellites; for fixed or mobile stations}
- 7/18573 {for operations control, administration or maintenance}
- 7/18576 {Satellite systems for providing narrowband data service to fixed or mobile stations, e.g. using a minisatellite, a microsatellite ([for selecting H04W](#))}
- 7/18578 {Satellite systems for providing broadband data service to individual earth stations ([for selecting H04W](#); [provisions for broadband connection, H04Q 11/0478](#))}
- 7/1858 {Arrangements for data transmission on the physical system, i.e. for data bit transmission between network components}
- 7/18582 {Arrangements for data linking, i.e. for data framing, for error recovery, for multiple access}
- 7/18584 {Arrangements for data networking, i.e. for data packet routing, for congestion control ([data switching networks H04L 12/00](#))}
- 7/18586 {Arrangements for data transporting, e.g. for an end to end data transport or check}
- 7/18589 {Arrangements for controlling an end to end session, i.e. for initialising, synchronising or terminating an end to end link}
- 7/18591 {Arrangements for interconnecting multiple systems ([data switching networks H04L 12/00](#))}
- 7/18593 {Arrangements for preventing unauthorised access or for providing user protection ([arrangements for secret or secure communication H04L 9/00](#))}
- 7/18595 {Arrangements for adapting broadband applications to satellite systems}
- 7/18597 {Arrangements for system physical machines management, i.e. for construction, operations control, administration, maintenance}
- 7/19 Earth-synchronous stations
- 7/195 Non-synchronous stations
- 7/204 Multiple access
- 7/2041 {Spot beam multiple access}
- 7/2043 {Mixed mode, TDM and FDM systems}
- 7/2045 {SS-FDMA, FDMA satellite switching}
- 7/2046 {SS-TDMA, TDMA satellite switching}
- 7/2048 {Frame structure, synchronisation or frame acquisition in SS-TDMA systems}
- 7/208 Frequency-division multiple access {[FDMA]}
- 7/212 Time-division multiple access {[TDMA]}
- 7/2121 {Channels assignment to the different stations}

7/2123	. . . . . { Variable assignment, e.g. demand assignment }	7/2687	. . . . . { Inter base stations synchronisation }
7/2125	. . . . . { Synchronisation }	7/269	. . . . . { Leader-follower synchronisation }
7/2126	. . . . . { using a reference station }	7/2693	. . . . . { Centralised synchronisation, i.e. using external universal time reference, e.g. by using a global positioning system [GPS] or by distributing time reference over the wireline network }
7/2128	. . . . . { Changing of the reference station }		
7/216	. . . . Code division or spread-spectrum multiple access {[CDMA, SSMA]}	7/2696	. . . . . { Over the air autonomous synchronisation, e.g. by monitoring network activity (H04B 7/2693 takes precedence) }
7/22	. Scatter propagation systems {, e.g. ionospheric, tropospheric or meteor scatter }		
7/24	. for communication between two or more posts (wireless communication networks H04W)		
7/26	. . at least one of which is mobile		
7/2603	. . . { Arrangements for wireless physical layer control (H04B 7/2612 takes precedence) }	10/00	Transmission systems employing electromagnetic waves other than radio-waves, e.g. infrared, visible or ultraviolet light, or employing corpuscular radiation, e.g. quantum communication
7/2606	. . . . { Arrangements for base station coverage control, e.g. by using relays in tunnels }		NOTE
7/2609	. . . . { Arrangements for range control, e.g. by using remote antennas }		In this group, non-optical transmission systems are classified in group H04B 10/90 .
7/2612	. . . { Arrangements for wireless medium access control, e.g. by allocating physical layer transmission capacity (H04B 7/2615 - H04B 7/2643 take precedence; provision for broadband connection H04Q 11/0478) }	10/03	. Arrangements for fault recovery
7/2615	. . . { using hybrid frequency-time division multiple access [FDMA-TDMA] }	10/032	. . using working and protection systems { (H04J 14/0287 takes precedence) }
7/2618	. . . { using hybrid code-time division multiple access [CDMA-TDMA] }	10/035	. . using loopbacks
7/2621	. . . { using frequency division multiple access [FDMA] (H04B 7/2615 takes precedence) }	10/038	. . using bypasses
7/2625	. . . { using common wave }	10/07	. Arrangements for monitoring or testing transmission systems; Arrangements for fault measurement of transmission systems
7/2628	. . . { using code-division multiple access [CDMA] or spread spectrum multiple access [SSMA] (H04B 7/2618 takes precedence) }	10/071	. . using a reflected signal, e.g. using optical time domain reflectometers [OTDR]
7/2631	. . . . { for broadband transmission }	10/073	. . using an out-of-service signal (H04B 10/071 takes precedence)
7/2634	. . . . { for channel frequency control }	10/0731	. . . { Testing or characterisation of optical devices, e.g. amplifiers }
7/2637	. . . . { for logical channel control }	10/075	. . using an in-service signal (H04B 10/071 takes precedence)
7/264	. . . . { for data rate control }	10/077	. . . using a supervisory or additional signal
7/2643	. . . { using time-division multiple access [TDMA] (H04B 7/2615 , H04B 7/2618 take precedence) }	10/0771	. . . . { Fault location on the transmission path }
7/2646	. . . . { for broadband transmission }	10/0773	. . . . { Network aspects, e.g. central monitoring of transmission parameters }
7/265	. . . . { for channel frequency control }	10/0775	. . . . { Performance monitoring and measurement of transmission parameters }
7/2653	. . . . { for logical channel control }	10/0777	. . . . { Monitoring line amplifier or line repeater equipment }
7/2656	. . . . { for structure of frame, burst }	10/0779	. . . . { Monitoring line transmitter or line receiver equipment }
7/2659	. . . . { for data rate control }	10/079	. . . using measurements of the data signal
7/2662	. . . { Arrangements for Wireless System Synchronisation }	10/0791	. . . . { Fault location on the transmission path }
7/2665	. . . . { Arrangements for Wireless Frequency Division Multiple Access [FDMA] System Synchronisation }	10/0793	. . . . { Network aspects, e.g. central monitoring of transmission parameters }
7/2668	. . . . { Arrangements for Wireless Code-Division Multiple Access [CDMA] System Synchronisation, (for code acquisition H04B 1/7075 , for code tracking H04B 1/7085) }	10/0795	. . . . { Performance monitoring; Measurement of transmission parameters }
7/2671	. . . . { Arrangements for Wireless Time-Division Multiple Access [TDMA] System Synchronisation }	10/07951	. . . . . { Monitoring or measuring chromatic dispersion or PMD }
7/2675	. . . . . { Frequency synchronisation }	10/07953	. . . . . { Monitoring or measuring OSNR, BER or Q }
7/2678	. . . . . { Time synchronisation }	10/07955	. . . . . { Monitoring or measuring power }
7/2681	. . . . . { Synchronisation of a mobile station with one base station }	10/07957	. . . . . { Monitoring or measuring wavelength }
7/2684	. . . . . { Synchronisation of a mobile station with more than one base station }	10/0797	. . . . { Monitoring line amplifier or line repeater equipment }
		10/0799	. . . . { Monitoring line transmitter or line receiver equipment }

- 10/11 . Arrangements specific to free-space transmission, i.e. transmission through air or vacuum
- 10/112 . . Line-of-sight transmission over an extended range
- 10/1121 . . . {One-way transmission}
- 10/1123 . . . {Bidirectional transmission}
- 10/1125 {using a single common optical path}
- 10/1127 {using two distinct parallel optical paths}
- 10/1129 . . . {Arrangements for outdoor wireless networking of information}
- 10/114 . . Indoor or close-range type systems
- 10/1141 . . . {One-way transmission}
- 10/1143 . . . {Bidirectional transmission}
- 10/1149 . . . {Arrangements for indoor wireless networking of information}
- 10/116 . . . Visible light communication
- 10/118 . . specially adapted for satellite communication
- 10/25 . Arrangements specific to fibre transmission
- 10/2507 . . for the reduction or elimination of distortion or dispersion
- 10/25073 . . . {using spectral equalisation, e.g. spectral filtering}
- 10/25077 . . . {using soliton propagation}
- 10/2513 . . . due to chromatic dispersion
- 10/25133 {including a lumped electrical or optical dispersion compensator (H04B 10/2519, H04B 10/2525 takes precedence)}
- 10/25137 {using pulse shaping at the transmitter, e.g. pre-chirping or dispersion supported transmission [DST]}
- 10/2519 using Bragg gratings
- 10/2525 using dispersion-compensating fibres
- 10/25253 {with dispersion management, i.e. using a combination of different kind of fibres in the transmission system}
- 10/2531 using spectral inversion
- 10/2537 . . . due to scattering processes, e.g. Raman or Brillouin scattering
- 10/2543 . . . due to fibre non-linearities, e.g. Kerr effect
- 10/255 Self-phase modulation [SPM]
- 10/2557 Cross-phase modulation [XPM]
- 10/2563 Four-wave mixing [FWM]
- 10/2569 . . . due to polarisation mode dispersion [PMD]
- 10/2572 . . . {due to forms of polarisation-dependent distortion other than PMD}
- 10/2575 . . Radio-over-fibre, e.g. radio frequency signal modulated onto an optical carrier
- 10/25751 . . . {Optical arrangements for CATV or video distribution (adaptations of television systems for optical transmission H04N 7/22)}
- 10/25752 . . . {Optical arrangements for wireless networks}
- 10/25753 {Distribution optical network, e.g. between a base station and a plurality of remote units}
- 10/25754 {Star network topology}
- 10/25755 {Ring network topology}
- 10/25756 {Bus network topology}
- 10/25758 {between a central unit and a single remote unit by means of an optical fibre}
- 10/25759 {Details of the reception of RF signal or the optical conversion before the optical fibre}
- 10/2581 . . Multimode transmission
- 10/2587 . . using a single light source for multiple stations
- 10/2589 . . {Bidirectional transmission}
- 10/25891 . . . {Transmission components (H04B 10/40 takes precedence)}
- 10/27 . Arrangements for networking
- 10/271 . . {Combination of different networks, e.g. star and ring configuration in the same network or two ring networks interconnected}
- 10/272 . . Star-type networks {or tree-type networks}
- 10/2725 . . . {Star-type networks without a headend}
- 10/275 . . Ring-type networks
- 10/2755 . . . {Ring-type networks with a headend}
- 10/278 . . Bus-type networks
- 10/29 . Repeaters
- 10/291 . . in which processing or amplification is carried out without conversion of the main signal from optical form
- 10/2912 . . . {characterised by the medium used for amplification or processing}
- 10/2914 {using lumped semiconductor optical amplifiers [SOA]}
- 10/2916 {using Raman or Brillouin amplifiers}
- 10/293 . . . Signal power control
- 10/2931 {using AGC (H04B 10/294 takes precedence)}
- 10/2933 {considering the whole optical path}
- 10/2935 {with a cascade of amplifiers}
- 10/2937 {Systems with a repeater placed only at the beginning or the end of the system, i.e. repeaterless systems, e.g. systems with only post and pre-amplification}
- 10/2939 {Network aspects}
- 10/294 in a multiwavelength system, e.g. gain equalisation
- 10/2941 {using an equalising unit, e.g. a filter (H04B 10/296 takes precedence)}
- 10/2942 {using automatic gain control [AGC] (H04B 10/296 takes precedence)}
- 10/296 Transient power control, e.g. due to channel add/drop or rapid fluctuations in the input power
- 10/297 . . . Bidirectional amplification
- 10/2971 {A single amplifier for both directions}
- 10/2972 {Each direction being amplified separately}
- 10/298 . . . {Two-way repeaters, i.e. repeaters amplifying separate upward and downward lines}
- 10/299 . . . Signal waveform processing, e.g. reshaping or retiming
- 10/40 . Transceivers
- 10/43 . . using a single component as both light source and receiver, e.g. using a photoemitter as a photoreceiver
- 10/50 . Transmitters
- 10/501 . . {Structural aspects}
- 10/502 . . . {LED transmitters}
- 10/503 . . . {Laser transmitters}
- 10/504 {using direct modulation}
- 10/505 {using external modulation}
- 10/5051 {using a series, i.e. cascade, combination of modulators}
- 10/5053 {using a parallel, i.e. shunt, combination of modulators}
- 10/5055 {using a pre-coder}
- 10/5057 {using a feedback signal generated by analysing the optical output}

10/50572	. . . . . {to control the modulating signal amplitude including amplitude distortion}	10/6164	. . . . . {Estimation or correction of the frequency offset between the received optical signal and the optical local oscillator}
10/50575	. . . . . {to control the modulator DC bias}	10/6165	. . . . . {Estimation of the phase of the received optical signal, phase error estimation or phase error correction}
10/50577	. . . . . {to control the phase of the modulating signal}	10/6166	. . . . . {Polarisation demultiplexing, tracking or alignment of orthogonal polarisation components}
10/5059	. . . . . {using a feed-forward signal generated by analysing the optical or electrical input}	10/63	. . . Homodyne {, i.e. coherent receivers where the local oscillator is locked in frequency and phase to the carrier signal}
10/50593	. . . . . {to control the modulating signal amplitude including amplitude distortion}	10/64	. . . Heterodyne {, i.e. coherent receivers where, after the opto-electronic conversion, an electrical signal at an intermediate frequency [IF] is obtained}
10/50595	. . . . . {to control the modulator DC bias}	10/65	. . . {Intradyn, i.e. coherent receivers with a free running local oscillator having a frequency close but not phase-locked to the carrier signal}
10/50597	. . . . . {to control the phase of the modulating signal}	10/66	. . . Non-coherent receivers, e.g. using direct detection
10/506	. . . {Multiwavelength transmitters}	10/67	. . . Optical arrangements in the receiver
10/508	. . Pulse generation, e.g. generation of solitons	10/671	. . . . . {for controlling the input optical signal}
10/516	. . Details of coding or modulation	10/672	. . . . . {for controlling the power of the input optical signal}
10/5161	. . . {Combination of different modulation schemes}	10/673	. . . . . {using an optical preamplifier}
10/5162	. . . {Return-to-zero modulation schemes}	10/674	. . . . . {using a variable optical attenuator}
10/5165	. . . {Carrier suppressed; Single sideband; Double sideband or vestigial}	10/675	. . . . . {for controlling the optical bandwidth of the input signal, e.g. spectral filtering}
10/5167	. . . {Duo-binary; Alternative mark inversion; Phase shaped binary transmission}	10/676	. . . . . {for all-optical demodulation of the input optical signal}
10/524	. . . Pulse modulation	10/677	. . . . . {for differentially modulated signal, e.g. DPSK signals}
10/532	. . . Polarisation modulation	10/69	. . . Electrical arrangements in the receiver
10/54	. . . Intensity modulation	10/691	. . . . . {Arrangements for optimizing the photodetector in the receiver}
10/541	. . . . {Digital intensity or amplitude modulation}	10/6911	. . . . . {Photodiode bias control, e.g. for compensating temperature variations}
10/548	. . . Phase or frequency modulation	10/693	. . . . . {Arrangements for optimizing the preamplifier in the receiver}
10/556	. . . . Digital modulation, e.g. differential phase shift keying [DPSK] or frequency shift keying [FSK]	10/6931	. . . . . {Automatic gain control of the preamplifier}
10/5561	. . . . . {Digital phase modulation}	10/6932	. . . . . {Bandwidth control of bit rate adaptation}
10/5563	. . . . . {Digital frequency modulation}	10/6933	. . . . . {Offset control of the differential preamplifier}
10/564	. . Power control	10/695	. . . . . {Arrangements for optimizing the decision element in the receiver, e.g. by using automatic threshold control}
10/572	. . Wavelength control	10/697	. . . . . {Arrangements for reducing noise and distortion}
10/58	. . Compensation for non-linear transmitter output	10/6971	. . . . . {using equalisation}
10/588	. . . in external modulation systems	10/6972	. . . . . {using passive filtering}
10/60	. Receivers	10/6973	. . . . . {using noise matching networks}
10/61	. . Coherent receivers	10/70	. Photonic quantum communication
10/612	. . . {for optical signals modulated with a format different from binary or higher-order PSK [X-PSK], e.g. QAM, DPSK, FSK, MSK, ASK}	10/80	. Optical aspects relating to the use of optical transmission for specific applications, not provided for in groups H04B 10/03 - H04B 10/70 , e.g. optical power feeding or optical transmission through water
10/613	. . . {including phase diversity, e.g., having in-phase and quadrature branches, as in QPSK coherent receivers}	10/801	. . {using optical interconnects, e.g. light coupled isolators, circuit board interconnections}
10/614	. . . {comprising one or more polarization beam splitters, e.g. polarization multiplexed [PolMux] X-PSK coherent receivers, polarization diversity heterodyne coherent receivers (H04J 14/06 takes precedence)}	10/802	. . . {for isolation, e.g. using optocouplers}
10/615	. . . {Arrangements affecting the optical part of the receiver}	10/803	. . . {Free space interconnects, e.g. between circuit boards or chips}
10/6151	. . . . {comprising a polarization controller at the receiver's input stage}	10/806	. . {Arrangements for feeding power}
10/616	. . . {Details of the electronic signal processing in coherent optical receivers}		
10/6161	. . . . {Compensation of chromatic dispersion}		
10/6162	. . . . {Compensation of polarization related effects, e.g., PMD, PDL}		
10/6163	. . . . {Compensation of non-linear effects in the fiber optic link, e.g. self-phase modulation [SPM], cross-phase modulation [XPM], four wave mixing [FWM]}		

- 10/807 . . . {Optical power feeding, i.e. transmitting power using an optical signal}
- 10/808 . . . {Electrical power feeding of an optical transmission system}
- 10/85 . . Protection from unauthorised access, e.g. eavesdrop protection
- 10/90 . Non-optical transmission systems, e.g. transmission systems employing non-photonic corpuscular radiation
- 11/00 Transmission systems employing ultrasonic, sonic or infrasonic waves**
- 13/00 Transmission systems characterised by the medium used for transmission, not provided for in groups [H04B 3/00](#) - [H04B 11/00](#)**
- 13/005 . {Transmission systems in which the medium consists of the human body}
- 13/02 . Transmission systems in which the medium consists of the earth or a large mass of water thereon, e.g. earth telegraphy
- 14/00 Transmission systems not characterised by the medium used for transmission (details thereof [H04B 1/00](#))**
- 14/002 . {characterised by the use of a carrier modulation (using subcarrier modulation [H04B 14/08](#))}
- 14/004 . . {Amplitude modulation}
- 14/006 . . {Angle modulation}
- 14/008 . . {Polarisation modulation}
- 14/02 . characterised by the use of pulse modulation (in radio transmission relays [H04B 7/17](#))
- 14/023 . . {using pulse amplitude modulation}
- 14/026 . . {using pulse time characteristics modulation, e.g. width, position, interval}
- 14/04 . . using pulse code modulation
- 14/042 . . . {Special circuits, e.g. comparators}
- 14/044 . . . {Sample and hold circuits (in general [G11C 27/02](#))}
- 14/046 . . . {Systems or methods for reducing noise or bandwidth}
- 14/048 {Non linear compression or expansion}
- 14/06 . . using differential modulation, e.g. delta modulation
- 14/062 . . . {using delta modulation or one-bit differential modulation [1DPCM]}
- 14/064 {with adaptive feedback}
- 14/066 . . . {using differential modulation with several bits [NDPCM]}
- 14/068 {with adaptive feedback}
- 14/08 . characterised by the use of a sub-carrier
- 15/00 Suppression or limitation of noise or interference (by means associated with receiver [H04B 1/10](#))**
- 15/005 . {Reducing noise, e.g. humm, from the supply}
- 15/02 . Reducing interference from electric apparatus by means located at or near the interfering apparatus
- 15/025 . . {Reducing interference from ignition apparatus of fuel engines (cables with high resistance [H01B](#))}
- 15/04 . . the interference being caused by substantially sinusoidal oscillations, e.g. in a receiver or in a tape-recorder
- 15/06 . . . by local oscillators of receivers
- 17/00 Monitoring; Testing (of line transmission systems [H04B 3/46](#); arrangements for monitoring or testing transmission systems employing electromagnetic waves other than radio waves [H04B 10/07](#))**
- 17/0082 . {using service channels; using auxiliary channels}
- 17/0085 . . {using test signal generators}
- 17/0087 . . {using auxiliary channels or channel simulators}
- 17/10 . of transmitters
- 17/101 . . {for measurement of specific parameters of the transmitter or components thereof}
- 17/102 . . . {Power radiated at antenna}
- 17/103 . . . {Reflected power, e.g. return loss}
- 17/104 . . . {of other parameters, e.g. DC offset, delay or propagation times}
- 17/11 . . for calibration
- 17/12 . . . of transmit antennas, e.g. of the amplitude or phase
- 17/13 . . . of power amplifiers, e.g. gain or non-linearity
- 17/14 . . . of the whole transmission and reception path, e.g. self-test loop-back
- 17/15 . . Performance testing
- WARNING**
- Group [H04B 17/15](#) is impacted by reclassification into group [H04B 17/191](#).
- Groups [H04B 17/15](#) and [H04B 17/191](#) should be considered in order to perform a complete search.
- 17/16 . . . Test equipment located at the transmitter
- 17/17 . . . Detection of non-compliance or faulty performance, e.g. response deviations ([H04B 17/18](#) takes precedence)
- 17/18 . . . Monitoring during normal operation
- 17/19 . . . Self-testing arrangements
- 17/191 . . . {Over-the-air testing}
- WARNING**
- Group [H04B 17/191](#) is incomplete pending reclassification of documents from group [H04B 17/15](#).
- Groups [H04B 17/15](#) and [H04B 17/191](#) should be considered in order to perform a complete search.
- 17/20 . of receivers
- WARNING**
- Group [H04B 17/20](#) is impacted by reclassification into groups [H04B 17/201](#), [H04B 17/202](#), [H04B 17/203](#), [H04B 17/204](#), [H04B 17/22](#), [H04B 17/221](#), [H04B 17/25](#), [H04B 17/252](#), [H04B 17/253](#), [H04B 17/254](#) and [H04B 17/255](#).
- All groups listed in this Warning should be considered in order to perform a complete search.

- 17/201 . . {for measurement of specific parameters of the receiver or components thereof}
- WARNING**
- Groups [H04B 17/201](#), [H04B 17/202](#), [H04B 17/203](#) and [H04B 17/204](#) are incomplete pending reclassification of documents from group [H04B 17/20](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 17/202 . . . {Power received at the antenna}
- 17/203 . . . {Receiver sensitivity}
- 17/204 . . . {of interfering signals, e.g. passive intermodulation}
- 17/21 . . for calibration; for correcting measurements
- WARNING**
- Group [H04B 17/21](#) is impacted by reclassification into groups [H04B 17/22](#) and [H04B 17/221](#).
- Groups [H04B 17/21](#), [H04B 17/22](#) and [H04B 17/221](#) should be considered in order to perform a complete search.
- 17/22 . . . {for calibration of the receiver components}
- WARNING**
- Groups [H04B 17/22](#) and [H04B 17/221](#) are incomplete pending reclassification of documents from groups [H04B 17/20](#) and [H04B 17/21](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 17/221 {of receiver antennas, e.g. as to amplitude or phase}
- 17/23 . . Indication means, e.g. displays, alarms, audible means
- 17/24 . . with feedback of measurements to the transmitter
- 17/25 . . {taking multiple measurements}
- WARNING**
- Groups [H04B 17/25](#), [H04B 17/252](#), [H04B 17/253](#), [H04B 17/254](#) and [H04B 17/255](#) are incomplete pending reclassification of documents from group [H04B 17/20](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 17/252 . . . {measuring signals from different transmission points or directions of arrival, e.g. in multi RAT or dual connectivity}
- 17/253 . . . {measuring at different locations or reception points}
- 17/254 . . . {measuring at different reception times}
- 17/255 . . . {measuring at different states of transmission, e.g. active or idle; measuring at different measurement rates; measuring with different measurement schedules}
- 17/26 . . using historical data, averaging values or statistics
- 17/27 . . for locating or positioning the transmitter

- 17/29 . . Performance testing

WARNING

Group [H04B 17/29](#) is impacted by reclassification into groups [H04B 17/294](#), [H04B 17/295](#), [H04B 17/296](#) and [H04B 17/297](#).

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

- 17/294 . . . {with test equipment located at the receiver}

WARNING

Group [H04B 17/294](#) is incomplete pending reclassification of documents from group [H04B 17/29](#).

Groups [H04B 17/29](#) and [H04B 17/294](#) should be considered in order to perform a complete search.

- 17/295 . . . {Detection of non-compliance or faulty performance, e.g. response deviations (monitoring during normal operations [H04B 17/296](#))}

WARNING

Group [H04B 17/295](#) is incomplete pending reclassification of documents from group [H04B 17/29](#).

Groups [H04B 17/29](#) and [H04B 17/295](#) should be considered in order to perform a complete search.

- 17/296 . . . {Monitoring performance during normal operation}

WARNING

Group [H04B 17/296](#) is incomplete pending reclassification of documents from group [H04B 17/29](#).

Groups [H04B 17/29](#) and [H04B 17/296](#) should be considered in order to perform a complete search.

- 17/297 . . . {Self-testing arrangements}

WARNING

Group [H04B 17/297](#) is incomplete pending reclassification of documents from group [H04B 17/29](#).

Groups [H04B 17/29](#) and [H04B 17/297](#) should be considered in order to perform a complete search.

- 17/30 . of propagation channels
- 17/309 . . Measuring or estimating channel quality parameters

WARNING

Group [H04B 17/309](#) is impacted by reclassification into groups [H04B 17/346](#) and [H04B 17/347](#).

Groups [H04B 17/309](#), [H04B 17/346](#) and [H04B 17/347](#) should be considered in order to perform a complete search.

17/318	. . . Received signal strength	17/404	. . . . {selected by local filters}
	WARNING	17/405	. . . . {generated by local multipliers, dividers, modulators}
	Group H04B 17/318 is impacted by reclassification into group H04B 17/328 .	17/406	. . . {using coded addresses}
	Groups H04B 17/318 and H04B 17/328 should be considered in order to perform a complete search.	17/407	. . {without selective localization}
17/327	. . . . Received signal code power [RSCP]	17/408	. . . {using successive loop-backs}
17/328	. . . . {Reference signal received power [RSRP]; Reference signal received quality [RSRQ]}	17/409	. . . {by means of resistance, voltage or current measurement}
	WARNING	2201/00	Indexing scheme relating to details of transmission systems not covered by a single group of H04B 3/00 - H04B 13/00
	Group H04B 17/328 is incomplete pending reclassification of documents from group H04B 17/318 .	2201/69	. Orthogonal indexing scheme relating to spread spectrum techniques in general
	Groups H04B 17/318 and H04B 17/328 should be considered in order to perform a complete search.	2201/692	. . Cognitive radio
17/336	. . . Signal-to-interference ratio [SIR] or carrier-to-interference ratio [CIR]	2201/694	. . WPAN
17/345	. . . Interference values ({signal-to-interference ratio [SIR] or carrier-to-interference ratio [CIR]} H04B 17/336)	2201/696	. . relating to Downlink
17/346	. . . {Noise values (signal-to-interference ratio [SIR] or carrier-to-interference ratio [CIR] H04B 17/336)}	2201/698	. . relating to Uplink
	WARNING	2201/707	. . relating to direct sequence modulation
	Group H04B 17/346 is incomplete pending reclassification of documents from group H04B 17/309 .	2201/70701	. . . featuring pilot assisted reception
	Groups H04B 17/309 and H04B 17/346 should be considered in order to perform a complete search.	2201/70702	. . . Intercell-related aspects
17/347	. . . {Path loss}	2201/70703	. . . using multiple or variable rates
	WARNING	2201/70705	. . . . Rate detection
	Group H04B 17/347 is incomplete pending reclassification of documents from group H04B 17/309 .	2201/70706	. . . with means for reducing the peak-to-average power ratio
	Groups H04B 17/309 and H04B 17/347 should be considered in order to perform a complete search.	2201/70707	. . . Efficiency-related aspects
17/354	. . . Adjacent channel leakage power	2201/70709	. . . . with discontinuous detection
17/364	. . . Delay profiles	2201/7071	. . . . with dynamic control of receiver resources
17/373	. . Predicting channel quality {or other radio frequency [RF]} parameters	2201/70711	. . . . . with modular structure
17/382	. . for resource allocation, admission control or handover	2201/70713	. . . . Reducing computational requirements
17/391	. . Modelling the propagation channel	2201/70714	. . . . Reducing hardware requirements
17/3911	. . . {Fading models or fading generators}	2201/70715	. . . with application-specific features
17/3912	. . . {Simulation models, e.g. distribution of spectral power density or received signal strength indicator [RSSI] for a given geographic region}	2201/70716	. . . Quadrature
17/3913	. . . {Predictive models, e.g. based on neural network models}	2201/70718	. . . Particular systems or standards
17/40	. of relay systems	2201/70719	. . . . CDMA2000
17/401	. . {with selective localization}	2201/7072	. . . . HDR
17/402	. . . {using different frequencies}	2201/70722	. . . . HSDPA/HSUPA
17/403	. . . . {generated by local oscillators}	2201/70723	. . . . . Multi-carrier HSPA
		2201/70724	. . . . UMTS
		2201/70726	. . . . Asynchronous CDMA
		2201/70727	. . . using fast Fourier transform
		2201/70728	. . . Frequency aspects
		2201/7073	. . . Direct sequence modulation synchronisation
		2201/70733	. . . . 2D search
		2201/70736	. . . . DSA
		2201/7097	. . . Direct sequence modulation interference
		2201/709709	. . . . Methods of preventing interference
		2201/709718	. . . . Determine interference
		2201/709727	. . . . GRAKE type RAKE receivers
		2201/709736	. . . . Hybrid interference mitigation schemes
		2201/709745	. . . . Iterative interference mitigation schemes
		2201/709754	. . . . Blind joint detection
		2201/709763	. . . . Joint detection using feedback
		2201/709772	. . . . Joint detection using feedforward
		2201/709781	. . . . Linear detectors for joint detection
		2201/70979	. . . . Fat finger issues in RAKE receivers
		2201/713	. . Frequency hopping
		2201/71307	. . . Partial band interference
		2201/71315	. . . Wide band interference
		2201/71323	. . . Adaptive systems
		2201/7133	. . . Asymmetric systems
		2201/71338	. . . Asynchronous systems

- 2201/71346 . . . Bluetooth®
- 2201/71353 . . . Fast frequency hopping
- 2201/71361 . . . Slow frequency hopping
- 2201/71369 . . . OFCHM
- 2201/71376 . . . Threshold
- 2201/71384 . . . Look-up tables
- 2201/7163 . . . Orthogonal indexing scheme relating to impulse radio
- 2201/71632 . . . Diversity
- 2201/71634 . . . Applied to ranging
- 2201/71636 . . . Transmitted reference
- 2201/71638 . . . Spectrum issues
- 2203/00 Indexing scheme relating to line transmission systems**
- 2203/54 . . Aspects of powerline communications not already covered by [H04B 3/54](#) and its subgroups
- 2203/5404 . . Methods of transmitting or receiving signals via power distribution lines
- 2203/5408 . . . using protocols
- 2203/5412 . . . by modifying wave form of the power source
- 2203/5416 . . . by adding signals to the wave form of the power source
- 2203/542 . . . using zero crossing information
- 2203/5425 . . . improving S/N by matching impedance, noise reduction, gain control
- 2203/5429 . . Applications for powerline communications
- 2203/5433 . . . Remote metering
- 2203/5437 . . . Wired telephone
- 2203/5441 . . . Wireless systems or telephone
- 2203/5445 . . . Local network
- 2203/545 . . . Audio/video application, e.g. interphone
- 2203/5454 . . . Adapter and plugs
- 2203/5458 . . . Monitor sensor; Alarm systems
- 2203/5462 . . Systems for power line communications
- 2203/5466 . . . using three phases conductors
- 2203/547 . . . via DC power distribution
- 2203/5475 . . . adapted for drill or well combined with data transmission
- 2203/5479 . . . using repeaters
- 2203/5483 . . . using coupling circuits
- 2203/5487 cables
- 2203/5491 . . . using filtering and bypassing
- 2203/5495 . . . having measurements and testing channel
- 2210/00 Indexing scheme relating to optical transmission systems**
- 2210/003 . . Devices including multiple stages, e.g., multi-stage optical amplifiers or dispersion compensators
- 2210/006 . . Devices for generating or processing an RF signal by optical means
- 2210/07 . . Monitoring an optical transmission system using a supervisory signal
- 2210/071 . . . using alarms
- 2210/072 . . . using an overhead signal
- 2210/074 . . . using a superposed, over-modulated signal
- 2210/075 . . . using a pilot tone
- 2210/077 . . . using a separate fibre
- 2210/078 . . . using a separate wavelength
- 2210/08 . . Shut-down or eye-safety
- 2210/25 . . Distortion or dispersion compensation
- 2210/252 . . . after the transmission line, i.e. post-compensation
- 2210/254 . . . before the transmission line, i.e. pre-compensation
- 2210/256 . . . at the repeater, i.e. repeater compensation
- 2210/258 . . . treating each wavelength or wavelength band separately
- 2210/516 . . Optical conversion of optical modulation formats, e.g., from optical ASK to optical PSK
- 2210/517 . . Optical NRZ to RZ conversion, or vice versa
- 2215/00 Reducing interference at the transmission system level**
- 2215/061 . . Reduction of burst noise, e.g. in TDMA systems
- 2215/062 . . . by inhibiting burst transmission
- 2215/063 . . . by smoothing the transmission power envelope
- 2215/064 . . Reduction of clock or synthesizer reference frequency harmonics
- 2215/065 . . . by changing the frequency of clock or reference frequency
- 2215/066 . . . by stopping a clock generator
- 2215/067 . . . by modulation dispersion
- 2215/068 . . . by avoiding a reception frequency range
- 2215/069 . . Reduction of switch mode power supply ripple