

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.

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](#)

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|--------|--|--------|---|
| 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)} | 1/0035 | . . . {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)} |
| 1/0007 | . . {wherein the AD/DA conversion occurs at radiofrequency or intermediate frequency stage} | 1/0039 | . . . {using DSP [Digital Signal Processor] quadrature modulation and demodulation} |
| 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)} | 1/0042 | . . . {Digital filtering (H04B 1/0035 takes precedence; digital filters per se H03H 17/00)} |
| 1/0014 | . . . {using DSP [Digital Signal Processor] quadrature modulation and demodulation} | 1/0046 | . . . {Decimation, i.e. data rate reduction techniques} |
| 1/0017 | . . . {Digital filtering (H04B 1/001 takes precedence; digital filters per se H03H 17/00)} | 1/005 | . {adapting radio receivers, transmitters and transceivers for operation on two or more bands, i.e. frequency ranges} |
| 1/0021 | . . . {Decimation, i.e. data rate reduction techniques (H04B 1/0025 takes precedence)} | 1/0053 | . . {with common antenna for more than one 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)} | 1/0057 | . . . {using diplexing or multiplexing filters for selecting the desired band} |
| 1/0028 | . . {wherein the AD/DA conversion occurs at baseband stage} | 1/006 | . . . {using switches for selecting the desired band (H04B 1/0057 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)} | 1/0064 | . . {with separate antennas for the more than one band (H04B 1/0053 takes precedence)} |
| | | 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	1/123	. . . . {using adaptive balancing or compensation means (adaptive filter circuits and algorithms H03H)}
1/03	. . Constructional details, e.g. casings, housings	1/126	. . . . {having multiple inputs, e.g. auxiliary antenna for receiving interfering signal (aerials in general H01Q)}
1/034	. . . Portable transmitters	1/14	. . . Automatic detuning arrangements
1/0343	. . . . {to be carried on the body}	1/16	. . Circuits
1/0346	. . . . {Hand-held transmitters}	1/1607	. . . {Supply circuits (converters H02M ; filters therefor H02M 1/14 ; voltage stabilisers G05F 1/46)}
1/036	. . . Cooling arrangements	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)}
1/04	. . Circuits	1/1623	. . . . {using tubes}
2001/0408	. . . {with power amplifiers}	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)}
2001/0416	. . . . {having gain or transmission power control}	1/1638	. . . {Special circuits to enhance selectivity of receivers not otherwise provided for (resonant circuits H03H)}
2001/0425	. . . . {with linearisation using predistortion}	1/1646	. . . {adapted for the reception of stereophonic signals}
2001/0433	. . . . {with linearisation using feedback}	1/1653	. . . . {Detection of the presence of stereo signals and pilot signal regeneration}
2001/0441	. . . . {with linearisation using feed-forward}	1/1661	. . . . {Reduction of noise by manipulation of the baseband composite stereophonic signal or the decoded left and right channels}
2001/045	. . . . {with means for improving efficiency}	1/1669	. . . . . {of the demodulated composite stereo signal}
1/0458	. . . {Arrangements for matching and coupling between power amplifier and antenna or between amplifying stages (matching circuits in general H03H)}	1/1676	. . . . . {of the sum or difference signal}
1/0466	. . . {Fault detection or indication (H04B 1/0483 takes precedence)}	1/1684	. . . . . {of the decoded left or right stereo channel}
1/0475	. . . {with means for limiting noise, interference or distortion (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)}
1/0483	. . . {Transmitters with multiple parallel paths}	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)
2001/0491	. . . {with frequency synthesizers, frequency converters or modulators}	1/20	. . . for coupling gramophone pick-up, recorder output, or microphone to receiver
1/06	. Receivers	1/202	. . . . {by remote control}
1/08	. . Constructional details, e.g. cabinet	1/205	. . . . {with control bus for exchanging commands between units}
1/082	. . . {to be used in vehicles (H04B 1/086 takes precedence; holding or mounting accessories B60R 11/02)}	1/207	. . . . {with an audio or audio/video bus for signal distribution (H04B 1/205 takes precedence)}
2001/084	. . . . {with removable front panel}	1/22	. . . for receivers in which no local oscillation is generated
1/086	. . . {Portable receivers}	1/24	. . . . the receiver comprising at least one semiconductor device having three or more electrodes
1/088	. . . . {with parts of the receiver detachable or collapsible}	1/26	. . . for superheterodyne receivers (multiple frequency-changing H03D 7/16)
1/10	. . Means associated with receiver for limiting or suppressing noise or interference	1/28	. . . . the receiver comprising at least one semiconductor device having three or more electrodes
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)}	1/30	. . . for homodyne or synchrodyne receivers (demodulator circuits H03D 1/22)
1/1018	. . . {noise filters connected between the power supply and the receiver (suppression or limitation of noise from electric apparatus H04B 15/00 ; demodulation H03D ; ripple filters H02M 1/14 ; filters in general 95G , H03H ; power supplies H04B 1/1607)}		
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		

- 1/302 {for single sideband receivers ([demodulator circuits H03D 1/24](#))}
- 2001/305 {using dc offset compensation techniques}
- 2001/307 {using n-port mixer}
- 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
- 1/3805 . . with built-in auxiliary receivers
- 2001/3811 . . . {Split configuration of transmission devices}
- 1/3816 . . Mechanical arrangements for accommodating identification devices, e.g. cards or chips; with connectors for programming identification devices
- 1/3818 . . . Arrangements for facilitating insertion or removal of identification devices
- 1/3822 . . specially adapted for use in vehicles ([H04B 1/3827 takes precedence](#))
- 1/3827 . . Portable transceivers
- 1/3833 . . . {Hand-held transceivers}
- 1/3838 {Arrangements for reducing RF exposure to the user, e.g. by changing the shape of the transceiver while in use}
- 2001/3844 {with means to alert the user that a certain exposure has been reached}
- 1/385 . . . {Transceivers carried on the body, e.g. in helmets}
- 2001/3855 {carried in a belt or harness}
- 2001/3861 {carried in a hand or on fingers}
- 2001/3866 {carried on the head}
- 2001/3872 {with extendable microphones or earphones}
- 1/3877 . . . Arrangements for enabling portable transceivers to be used in a fixed position, e.g. cradles or boosters
- 1/3883 . . . Arrangements for mounting batteries or battery chargers
- 1/3888 . . . Arrangements for carrying or protecting transceivers
- 2001/3894 . . {Waterproofing of transmission device}
- 1/40 . . Circuits
- 1/401 . . . for selecting or indicating operating mode
- 1/403 . . . using the same oscillator for generating both the transmitter frequency and the receiver local oscillator frequency
- 1/405 with multiple discrete channels
- 1/406 {with more than one transmission mode, e.g. analog and digital modes}
- 1/408 the transmitter oscillator frequency being identical to the receiver local oscillator frequency
- 1/44 . . . Transmit/receive switching
- 1/46 by voice-frequency signals; by pilot signals
- 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](#))}
- 2001/485 {inhibiting unwanted transmission}
- 1/50 . . . using different frequencies for the two directions of communication
- 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
- 1/525 with means for reducing leakage of transmitter signal into the receiver
- 1/54 . . . using the same frequency for two directions of communication ([H04B 1/44 takes precedence](#))
- 1/56 with provision for simultaneous communication in two directions
- 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
- 1/581 {using a transformer}
- 1/582 {with automatic balancing}
- 1/583 {using a bridge network}
- 1/585 {with automatic balancing}
- 1/586 {using an electronic circuit}
- 1/587 {using opto-couplers ([light transmission systems H04B 10/00](#))}
- 1/588 {using sampling gates}
- 1/59 . Responders; Transponders
- 1/60 . Supervising unattended repeaters
- 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
- 1/64 . . Volume compression or expansion arrangements
- 1/66 . for reducing bandwidth of signals; for improving efficiency of transmission ([H04B 1/68 takes precedence](#))
- 1/662 . . {using a time/frequency relationship, e.g. time compression or expansion}
- 1/665 . . {using psychoacoustic properties of the ear, e.g. masking effect}
- 1/667 . . {using a division in frequency subbands ([for TV signals H04N 19/63](#))}
- 1/68 . for wholly or partially suppressing the carrier or one side band
- 1/69 . Spread spectrum techniques
- 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
- 2001/70706 . . . {using a code tracking loop, e.g. a delay locked loop}
- 1/70712 . . . {with demodulation by means of convolvers, e.g. of the SAW type ([SAW convolvers in general G06G 7/195](#))}
- 1/70718 . . . {with asynchronous demodulation, i.e. not requiring code synchronisation}
- 2001/70724 . . . {featuring pilot assisted reception}
- 1/7073 . . . Synchronisation aspects
- 1/70735 {Code identification ([H04B 1/7083 takes precedence](#))}
- 1/7075 with code phase acquisition
- 1/70751 {using partial detection ([H04B 1/70758 takes precedence](#))}
- 1/70752 {Partial correlation}
- 1/70753 {Partial phase search}
- 1/70754 {Setting of search window, i.e. range of code offsets to be searched ([H04B 1/70758 takes precedence](#))}
- 1/70755 {Setting of lock conditions, e.g. threshold}

1/70756	. . . . .	{Jumping within the code, i.e. masking or slewing (H04B 1/70758 takes precedence)}
1/70757	. . . . .	{with increased resolution, i.e. higher than half a chip (H04B 1/70758 takes precedence)}
1/70758	. . . . .	{Multimode search, i.e. using multiple search strategies}
1/7077	. . . . .	Multi-step acquisition, e.g. multi-dwell, coarse-fine or validation
1/70775	. . . . .	{Multi-dwell schemes, i.e. multiple accumulation times}
1/708	. . . . .	Parallel implementation
1/7083	. . . . .	Cell search, e.g. using a three-step approach
1/7085	. . . . .	using a code tracking loop, e.g. a delay-locked loop
2001/70855	. . . . .	{Dithering}
1/7087	. . . . .	Carrier synchronisation aspects
1/709	. . . . .	Correlator structure
1/7093	. . . . .	Matched filter type
2001/70935	. . . . .	{using a bank of matched filters, e.g. Fast Hadamard Transform}
1/7095	. . . . .	Sliding correlator type
1/7097	. . . . .	Interference-related aspects
1/71	. . . . .	the interference being narrowband interference
1/7101	. . . . .	{with estimation filters}
1/7102	. . . . .	{with transform to frequency domain}
1/7103	. . . . .	the interference being multiple access interference
1/7105	. . . . .	Joint detection techniques, e.g. linear detectors
1/71052	. . . . .	{using decorrelation matrix}
1/71055	. . . . .	{using minimum mean squared error [MMSE] detector}
1/71057	. . . . .	{using maximum-likelihood sequence estimation [MLSE]}
1/7107	. . . . .	Subtractive interference cancellation
1/71072	. . . . .	{Successive interference cancellation}
1/71075	. . . . .	{Parallel interference cancellation}
2001/71077	. . . . .	{Partial interference cancellation}
1/711	. . . . .	the interference being multi-path interference
1/7113	. . . . .	Determination of path profile
1/7115	. . . . .	Constructive combining of multi-path signals, i.e. RAKE receivers
WARNING		
Group H04B 1/7115 is incomplete pending reclassification of documents from group H04B 7/02 .		
Groups H04B 7/02 and H04B 1/7115 should be considered in order to perform a complete search.		
1/7117	. . . . .	Selection, re-selection, allocation or re-allocation of paths to fingers, e.g. timing offset control of allocated fingers
1/712	. . . . .	Weighting of fingers for combining, e.g. amplitude control or phase rotation using an inner loop
1/713	. . . . .	using frequency hopping
1/7136	. . . . .	Arrangements for generation of hop frequencies, e.g. using a bank of frequency sources, using continuous tuning or using a transform
2001/71362	. . . . .	{using a bank of frequency sources}
2001/71365	. . . . .	{using continuous tuning of a single frequency source}
2001/71367	. . . . .	{using a transform}
1/7143	. . . . .	Arrangements for generation of hop patterns
1/715	. . . . .	Interference-related aspects
2001/7152	. . . . .	{with means for suppressing interference}
2001/7154	. . . . .	{with means for preventing interference}
1/7156	. . . . .	Arrangements for sequence synchronisation
2001/71563	. . . . .	{Acquisition}
2001/71566	. . . . .	{Tracking}
1/7163	. . . . .	using impulse radio
1/71632	. . . . .	{Signal aspects (H04B 1/7172 and H04B 1/7176 take precedence)}
1/71635	. . . . .	{Transmitter aspects (H04B 1/7174 takes precedence)}
1/71637	. . . . .	{Receiver aspects (H04B 1/7183 takes precedence)}
1/717	. . . . .	Pulse-related aspects
1/7172	. . . . .	{Pulse shape (in general H04L 25/03834)}
1/7174	. . . . .	{Pulse generation (in general H04L 25/03834)}
1/7176	. . . . .	Data mapping, e.g. modulation
1/7183	. . . . .	Synchronisation
1/719	. . . . .	Interference-related aspects
1/72	. . . . .	Circuits or components for simulating antennas, e.g. dummy antennas
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)}
1/745	. . . . .	{using by-passing or self-healing methods}
1/76	. . . . .	Pilot transmitters or receivers for control of transmission or for equalising
3/00		Line transmission systems (combined with near-field transmission systems H04B 5/00)
3/02	. . . . .	Details
3/03	. . . . .	Hybrid circuits (for transceivers H04B 1/52 , H04B 1/58)
3/04	. . . . .	Control of transmission; Equalising
3/06	. . . . .	by the transmitted signal
3/08	. . . . .	in negative-feedback path of line amplifier
3/10	. . . . .	by pilot signal
3/11	. . . . .	using pilot wire (H04B 3/12 takes precedence)
3/12	. . . . .	in negative-feedback path of line amplifier
3/14	. . . . .	characterised by the equalising network used
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 unbalance current 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 loop type**
- 5/0006 . {using a receiver structurally associated with a loudspeaker or an earphone}
- 5/0012 . {using capacitive coupling}
- 5/0018 . {using leaky or radiating cables, e.g. leaky coaxial cables or power lines for inductive transmission (leaky cables [per se H01Q 13/20](#); for railways [B61L 3/22](#))}
- 5/0025 . {Near field system adaptations}
- 5/0031 . . {for data transfer}
- 5/0037 . . {for power transfer}
- 5/0043 . . {for taking measurements, e.g. using sensor coils}
- 5/005 . . {for isolation purposes}
- 5/0056 . {for use in interrogation, identification or read/write systems (record carriers [G06K 7/00](#), [G06K 19/00](#); for railways [B61L 3/12](#))}
- 5/0062 . . {in RFID [Radio Frequency Identification] Systems}
- 5/0068 . . {in transponders}
- 5/0075 . {using inductive coupling (transformers or inductances adapted for inductive coupling [H01F 38/14](#))}
- 5/0081 . . {with antenna coils (loop aerials [H01Q 7/00](#))}
- 5/0087 . . {with multiple coils at either side}
- 5/0093 . . {with one coil at each side, e.g. with primary and secondary coils}
- 5/02 . using transceiver
- 5/04 . Calling systems, e.g. paging system
- 5/06 . using a portable transmitter associated with a microphone
- 7/00 Radio transmission systems, i.e. using radiation field ([H04B 10/00](#), [H04B 15/00](#) take precedence)**
- 7/002 . {Reducing depolarization effects}
- 7/005 . Control of transmission; Equalising
- 7/01 . Reducing phase shift
- 7/015 . Reducing echo effects
- 7/02 . Diversity systems; Multi-antenna system, i.e. transmission or reception using multiple antennas ([RAKE receivers H04B 1/7115](#))
- WARNING**
- Group [H04B 7/02](#) is impacted by reclassification into group [H04B 1/7115](#).
- Groups [H04B 7/02](#) and [H04B 1/7115](#) should be considered in order to perform a complete search.
- 7/022 . . Site diversity; Macro-diversity (using two or more spaced independent antennas [H04B 7/04](#))
- 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
- 7/026 . . . Co-operative diversity, e.g. using fixed or mobile stations as relays
- 7/028 . . {Spatial transmit diversity using a single antenna at the transmitter}
- 7/04 . . using two or more spaced independent antennas

7/0404	. . . the mobile station comprising multiple antennas, e.g. to provide uplink diversity	7/0632	. . . . . {Channel quality parameters, e.g. channel quality indicator [CQI]}
7/0408	. . . using two or more beams, i.e. beam diversity	7/0634	. . . . . {Antenna weights or vector/matrix coefficients}
7/0413	. . . MIMO systems	7/0636	. . . . . {Feedback format}
7/0417	. . . . Feedback systems	7/0639	. . . . . {Using selective indices, e.g. of a codebook, e.g. pre-distortion matrix index [PMI] or for beam selection}
7/0421	. . . . . {utilizing implicit feedback, e.g. steered pilot signals}	7/0641	. . . . . {Differential feedback}
7/0426	. . . . Power distribution	7/0643	. . . . . {Feedback on request}
7/043	. . . . . {using best eigenmode, e.g. beam forming or beam steering}	7/0645	. . . . . {Variable feedback}
7/0434	. . . . . {using multiple eigenmodes}	7/0647	. . . . . {Variable feedback rate}
7/0439	. . . . . {utilizing channel inversion}	7/065	. . . . . {Variable contents, e.g. long-term or short-short}
7/0443	. . . . . {utilizing "waterfilling" technique}	7/0652	. . . . . {Feedback error handling}
7/0447	. . . . . {utilizing uniform distribution}	7/0654	. . . . . {at the receiver, e.g. antenna verification at mobile station}
7/0452	. . . . Multi-user MIMO systems	7/0656	. . . . . {at the transmitter, e.g. error detection at base station}
7/0456	. . . . Selection of precoding matrices or codebooks, e.g. using matrices antenna weighting	7/0658	. . . . . {Feedback reduction}
7/046	. . . . . {taking physical layer constraints into account}	7/066	. . . . . {Combined feedback for a number of channels, e.g. over several subcarriers like in orthogonal frequency division multiplexing [OFDM]}
7/0465	. . . . . {taking power constraints at power amplifier or emission constraints, e.g. constant modulus, into account}	7/0663	. . . . . {using vector or matrix manipulations}
7/0469	. . . . . {taking special antenna structures, e.g. cross polarized antennas into account}	7/0665	. . . . . {Feed forward of transmit weights to the receiver}
7/0473	. . . . . {taking constraints in layer or codeword to antenna mapping into account}	7/0667	. . . . . {of delayed versions of same signal (using space-time coding H04L 1/0618)}
7/0478	. . . . . {Special codebook structures directed to feedback optimization}	7/0669	. . . . . {using different channel coding between antennas (space-time coding H04L 1/0618)}
7/0482	. . . . . {Adaptive codebooks}	7/0671	. . . . . {using different delays between antennas}
7/0486	. . . . . {taking channel rank into account}	7/0673	. . . . . {using feedback from receiving side}
7/0491	. . . using two or more sectors, i.e. sector diversity	7/0676	. . . . . {using random or pseudo-random delays}
7/0495	. . . using overlapping sectors in the same base station to implement MIMO for antennas	7/0678	. . . . . {using different spreading codes between antennas (code allocation H04J 13/16)}
7/06	. . . at the transmitting station	7/068	. . . . . {using space frequency diversity (space-frequency coding H04L 1/0606)}
7/0602	. . . . {using antenna switching (H04B 7/0686 takes precedence; antenna beam directivity switching H01Q 3/24)}	7/0682	. . . . . {using phase diversity (e.g. phase sweeping)}
7/0604	. . . . . {with predefined switching scheme}	7/0684	. . . . . {using different training sequences per antenna}
7/0606	. . . . . {Random or pseudo-random switching scheme}	7/0686	. . . . {Hybrid systems, i.e. switching and simultaneous transmission}
7/0608	. . . . . {Antenna selection according to transmission parameters}	7/0689	. . . . . {using different transmission schemes, at least one of them being a diversity transmission scheme}
7/061	. . . . . {using feedback from receiving side}	7/0691	. . . . . {using subgroups of transmit antennas}
7/0613	. . . . {using simultaneous transmission (H04B 7/0686 takes precedence)}	7/0693	. . . . . {switching off a diversity branch, e.g. to save power}
7/0615	. . . . . {of weighted versions of same signal}	7/0695	. . . . . {using beam selection}
7/0617	. . . . . {for beam forming}	7/0697	. . . . {using spatial multiplexing}
7/0619	. . . . . {using feedback from receiving side (feedback signaling for adaptive modulation/coding H04L 1/0001)}	7/08	. . . at the receiving station
7/0621	. . . . . {Feedback content}	7/0802	. . . . {using antenna selection (H04B 7/0868 takes precedence; antenna beam directivity switching H01Q 3/24)}
7/0623	. . . . . {Auxiliary parameters, e.g. power control [PCB] or not acknowledged commands [NACK], used as feedback information}	7/0805	. . . . . {with single receiver and antenna switching (H04B 7/0822 takes precedence)}
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}		

7/0808	. . . . .	{comparing all antennas before reception}	7/0891	. . . . .	{Space-time diversity (rake receivers H04B 1/7115 ; space-time decoding H04L 1/0631)}
7/0811	. . . . .	{during preamble or gap period}	7/0894	. . . . .	{using different delays between antennas}
7/0814	. . . . .	{based on current reception conditions, e.g. switching to different antenna when signal level is below threshold}	7/0897	. . . . .	{using beamforming per multi-path, e.g. to cope with different directions of arrival [DOA] at different multi-paths}
7/0817	. . . . .	{with multiple receivers and antenna path selection}	7/10	. .	Polarisation diversity; Directional diversity
7/082	. . . . .	{selecting best antenna path}	7/12	. .	Frequency diversity
7/0822	. . . . .	{according to predefined selection scheme}	7/14	. .	Relay systems
7/0825	. . . . .	{with main and with auxiliary or diversity antennas}	7/145	. .	Passive relay systems
7/0828	. . . . .	{with delay elements in antenna paths}	7/15	. .	Active relay systems
7/0831	. . . . .	{Compensation of the diversity switching process for non-uniform properties or faulty operations of the switches used in the diversity switching process}	7/155	. . .	Ground-based stations (H04B 7/204 takes precedence)
7/0834	. . . . .	{based on external parameters, e.g. subscriber speed or location}	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)}
7/0837	. . . . .	{using pre-detection combining (H04B 7/0868 takes precedence)}	7/15514	. . . . .	{for shadowing compensation (for satellite mobile telephony service systems H04B 7/18536)}
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)}	7/15521	. . . . .	{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)}
7/0842	. . . . .	{Weighted combining}	7/15528	. . . . .	{Control of operation parameters of a relay station to exploit the physical medium}
7/0845	. . . . .	{per branch equalization, e.g. by an FIR-filter or RAKE receiver per antenna branch (rake receivers as such H04B 1/7115)}	7/15535	. . . . .	{Control of relay amplifier gain (amplifier gain control in general H03G 3/00 ; gain control reducing self - or loop interference H04B 7/15578)}
7/0848	. . . . .	{Joint weighting}	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)}
7/0851	. . . . .	{using training sequences or error signal (minimizing error signal H04B 7/0854)}	7/1555	. . . . .	{Selecting relay station antenna mode, e.g. selecting omnidirectional -, directional beams, selecting polarizations}
7/0854	. . . . .	{using error minimizing algorithms, e.g. minimum mean squared error [MMSE], "cross-correlation" or matrix inversion}	7/15557	. . . . .	{Selecting relay station operation mode, e.g. between amplify and forward mode, decode and forward mode or FDD - and TDD mode}
7/0857	. . . . .	{using maximum ratio combining techniques, e.g. signal-to- interference ratio [SIR], received signal strenght indication [RSS]}	7/15564	. . . . .	{Relay station antennae loop interference reduction}
7/086	. . . . .	{using weights depending on external parameters, e.g. direction of arrival [DOA], predetermined weights or beamforming}	7/15571	. . . . .	{by signal isolation, e.g. isolation by frequency or by antenna pattern, or by polarization}
7/0862	. . . . .	{receiver computing weights based on information from the transmitter}	7/15578	. . . . .	{by gain adjustment}
7/0865	. . . . .	{Independent weighting, i.e. weights based on own antenna reception parameters}	7/15585	. . . . .	{by interference cancellation}
7/0868	. . . . .	{Hybrid systems, i.e. switching and combining}			
7/0871	. . . . .	{using different reception schemes, at least one of them being a diversity reception scheme}			
7/0874	. . . . .	{using subgroups of receive antennas}			
7/0877	. . . . .	{switching off a diversity branch, e.g. to save power}			
7/088	. . . . .	{using beam selection}			
7/0882	. . . . .	{using post-detection diversity}			
7/0885	. . . . .	{with combination}			
7/0888	. . . . .	{with 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](#))}
- 7/165 employing angle modulation
- 7/17 employing pulse modulation, e.g. pulse code modulation
- 7/185 . . . Space-based or airborne stations; {Stations for satellite systems} ([H04B 7/204](#) takes precedence)
- 7/18502 {Airborne stations}
- 7/18504 {Aircraft used as relay or high altitude atmospheric platform}
- 7/18506 {Communications with or from aircraft, i.e. aeronautical mobile service}
- 7/18508 {with satellite system used as relay, i.e. aeronautical mobile satellite service}
- 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](#))}
- 7/18513 {Transmission in a satellite or space-based system}
- 7/18515 {Transmission equipment in satellites or space-based relays}
- 7/18517 {Transmission equipment in earth stations}
- 7/18519 {Operations control, administration or maintenance}
- 7/18521 {Systems of inter linked satellites, i.e. inter satellite service ([for optical links between satellites H04B 10/118](#))}
- 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}	7/2628	. . . . .	{using code-division multiple access [CDMA] or spread spectrum multiple access [SSMA] (H04B 7/2618 takes precedence)}
7/18589	. . . . .	{Arrangements for controlling an end to end session, i.e. for initialising, synchronising or terminating an end to end link}	7/2631	. . . . .	{for broadband transmission}
7/18591	. . . . .	{Arrangements for interconnecting multiple systems (data switching networks H04L 12/00)}	7/2634	. . . . .	{for channel frequency control}
7/18593	. . . . .	{Arrangements for preventing unauthorised access or for providing user protection (arrangements for secret or secure communication H04L 9/00)}	7/2637	. . . . .	{for logical channel control}
7/18595	. . . . .	{Arrangements for adapting broadband applications to satellite systems}	7/264	. . . . .	{for data rate control}
7/18597	. . . . .	{Arrangements for system physical machines management, i.e. for construction, operations control, administration, maintenance}	7/2643	. . . . .	{using time-division multiple access [TDMA] (H04B 7/2615 , H04B 7/2618 take precedence)}
7/19	. . . . .	Earth-synchronous stations	7/2646	. . . . .	{for broadband transmission}
7/195	. . . . .	Non-synchronous stations	7/265	. . . . .	{for channel frequency control}
7/204	. . . . .	Multiple access	7/2653	. . . . .	{for logical channel control}
7/2041	. . . . .	{Spot beam multiple access}	7/2656	. . . . .	{for structure of frame, burst}
7/2043	. . . . .	{Mixed mode, TDM and FDM systems}	7/2659	. . . . .	{for data rate control}
7/2045	. . . . .	{SS-FDMA, FDMA satellite switching}	7/2662	. . . . .	{Arrangements for Wireless System Synchronisation}
7/2046	. . . . .	{SS-TDMA, TDMA satellite switching}	7/2665	. . . . .	{Arrangements for Wireless Frequency Division Multiple Access [FDMA] System Synchronisation}
7/2048	. . . . .	{Frame structure, synchronisation or frame acquisition in SS-TDMA systems}	7/2668	. . . . .	{Arrangements for Wireless Code-Division Multiple Access [CDMA] System Synchronisation, (for code acquisition H04B 1/7075 , for code tracking H04B 1/7085)}
7/208	. . . . .	Frequency-division multiple access {[FDMA]}	7/2671	. . . . .	{Arrangements for Wireless Time-Division Multiple Access [TDMA] System Synchronisation}
7/212	. . . . .	Time-division multiple access {[TDMA]}	7/2675	. . . . .	{Frequency synchronisation}
7/2121	. . . . .	{Channels assignment to the different stations}	7/2678	. . . . .	{Time synchronisation}
7/2123	. . . . .	{Variable assignment, e.g. demand assignment}	7/2681	. . . . .	{Synchronisation of a mobile station with one base station}
7/2125	. . . . .	{Synchronisation}	7/2684	. . . . .	{Synchronisation of a mobile station with more than one base station}
7/2126	. . . . .	{using a reference station}	7/2687	. . . . .	{Inter base stations synchronisation}
7/2128	. . . . .	{Changing of the reference station}	7/269	. . . . .	{Master/slave synchronisation}
7/216	. . . . .	Code division or spread-spectrum multiple access {[CDMA, SSMA]}	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}
7/22	. . . . .	Scatter propagation systems {, e.g. ionospheric, tropospheric or meteor scatter}	7/2696	. . . . .	{Over the air autonomous synchronisation, e.g. by monitoring network activity (H04B 7/2693 takes precedence)}
7/24	. . . . .	for communication between two or more posts (wireless communication networks H04W)	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	
7/26	. . . . .	at least one of which is mobile		NOTE	
7/2603	. . . . .	{Arrangements for wireless physical layer control (H04B 7/2612 takes precedence)}		In this group, non-optical transmission systems are classified in group H04B 10/90 .	
7/2606	. . . . .	{Arrangements for base station coverage control, e.g. by using relays in tunnels}	10/03	. . . . .	Arrangements for fault recovery
7/2609	. . . . .	{Arrangements for range control, e.g. by using remote antennas}	10/032	. . . . .	using working and protection systems {(H04J 14/0287 takes precedence)}
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)}	10/035	. . . . .	using loopbacks
7/2615	. . . . .	{using hybrid frequency-time division multiple access [FDMA-TDMA]}	10/038	. . . . .	using bypasses
7/2618	. . . . .	{using hybrid code-time division multiple access [CDMA-TDMA]}	10/07	. . . . .	Arrangements for monitoring or testing transmission systems; Arrangements for fault measurement of transmission systems
7/2621	. . . . .	{using frequency division multiple access [FDMA] (H04B 7/2615 takes precedence)}	10/071	. . . . .	using a reflected signal, e.g. using optical time-domain reflectometers [OTDRs]
7/2625	. . . . .	{using common wave}			

- 10/073 . . using an out-of-service signal ([H04B 10/071 takes precedence](#))
- 10/0731 . . . {Testing or characterisation of optical devices, e.g. amplifiers}
- 10/075 . . using an in-service signal ([H04B 10/071 takes precedence](#))
- 10/077 . . . using a supervisory or additional signal
- 10/0771 {Fault location on the transmission path}
- 10/0773 {Network aspects, e.g. central monitoring of transmission parameters}
- 10/0775 {Performance monitoring and measurement of transmission parameters}
- 10/0777 {Monitoring line amplifier or line repeater equipment}
- 10/0779 {Monitoring line transmitter or line receiver equipment}
- 10/079 . . . using measurements of the data signal
- 10/0791 {Fault location on the transmission path}
- 10/0793 {Network aspects, e.g. central monitoring of transmission parameters}
- 10/0795 {Performance monitoring; Measurement of transmission parameters}
- 10/07951 {Monitoring or measuring chromatic dispersion or PMD}
- 10/07953 {Monitoring or measuring OSNR, BER or Q}
- 10/07955 {Monitoring or measuring power}
- 10/07957 {Monitoring or measuring wavelength}
- 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}
- 10/50575 {to control the modulator DC bias}
- 10/50577 {to control the phase of the modulating signal}
- 10/5059 {using a feed-forward signal generated by analysing the optical or electrical input}
- 10/50593 {to control the modulating signal amplitude including amplitude distortion}
- 10/50595 {to control the modulator DC bias}
- 10/50597 {to control the phase of the modulating signal}
- 10/506 . . . {Multiwavelength transmitters}
- 10/508 . . Pulse generation, e.g. generation of solitons
- 10/516 . . Details of coding or modulation
- 10/5161 . . . {Combination of different modulation schemes}
- 10/5162 . . . {Return-to-zero modulation schemes}
- 10/5165 . . . {Carrier suppressed; Single sideband; Double sideband or vestigial}
- 10/5167 . . . {Duo-binary; Alternative mark inversion; Phase shaped binary transmission}
- 10/524 . . . Pulse modulation
- 10/532 . . . Polarisation modulation
- 10/54 . . . Intensity modulation
- 10/541 {Digital intensity or amplitude modulation}
- 10/548 . . . Phase or frequency modulation
- 10/556 Digital modulation, e.g. differential phase shift keying [DPSK] or frequency shift keying [FSK]
- 10/5561 {Digital phase modulation}
- 10/5563 {Digital frequency modulation}
- 10/564 . . Power control
- 10/572 . . Wavelength control
- 10/58 . . Compensation for non-linear transmitter output
- 10/588 . . . in external modulation systems
- 10/60 . Receivers
- 10/61 . . Coherent receivers
- 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}
- 10/613 . . . {including phase diversity, e.g., having in-phase and quadrature branches, as in QPSK coherent receivers}
- 10/614 . . . {comprising one or more polarization beam splitters, e.g. polarization multiplexed [PolMux] X-PSK coherent receivers, polarization diversity heterodyne coherent receivers [\(H04J 14/06 takes precedence\)](#)}
- 10/615 . . . {Arrangements affecting the optical part of the receiver}
- 10/6151 {comprising a polarization controller at the receiver's input stage}
- 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]}
- 10/6164 {Estimation or correction of the frequency offset between the received optical signal and the optical local oscillator}
- 10/6165 {Estimation of the phase of the received optical signal, phase error estimation or phase error correction}
- 10/6166 {Polarisation demultiplexing, tracking or alignment of orthogonal polarisation components}
- 10/63 . . . Homodyne {, i.e. coherent receivers where the local oscillator is locked in frequency and phase to the carrier signal}
- 10/64 . . . Heterodyne {, i.e. coherent receivers where, after the opto-electronic conversion, an electrical signal at an intermediate frequency [fIF] is obtained}
- 10/65 . . . {Intradyne, i.e. coherent receivers with a free running local oscillator having a frequency close but not phase-locked to the carrier signal}
- 10/66 . . Non-coherent receivers, e.g. using direct detection
- 10/67 . . . Optical arrangements in the receiver
- 10/671 {for controlling the input optical signal}
- 10/672 {for controlling the power of the input optical signal}
- 10/673 {using an optical preamplifier}
- 10/674 {using a variable optical attenuator}
- 10/675 {for controlling the optical bandwidth of the input signal, e.g. spectral filtering}

- 10/676 {for all-optical demodulation of the input optical signal}
- 10/677 {for differentially modulated signal, e.g. DPSK signals}
- 10/69 . . . Electrical arrangements in the receiver
- 10/691 {Arrangements for optimizing the photodetector in the receiver}
- 10/6911 {Photodiode bias control, e.g. for compensating temperature variations}
- 10/693 {Arrangements for optimizing the preamplifier in the receiver}
- 10/6931 {Automatic gain control of the preamplifier}
- 10/6932 {Bandwidth control of bit rate adaptation}
- 10/6933 {Offset control of the differential preamplifier}
- 10/695 {Arrangements for optimizing the decision element in the receiver, e.g. by using automatic threshold control}
- 10/697 {Arrangements for reducing noise and distortion}
- 10/6971 {using equalisation}
- 10/6972 {using passive filtering}
- 10/6973 {using noise matching networks}
- 10/70 . Photonic quantum communication
- 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
- 10/801 . . {using optical interconnects, e.g. light coupled isolators, circuit board interconnections}
- 10/802 . . . {for isolation, e.g. using optocouplers}
- 10/803 . . . {Free space interconnects, e.g. between circuit boards or chips}
- 10/806 . . {Arrangements for feeding power}
- 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 sonic, ultrasonic 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 parameters}
- 17/102 . . . {of radiated power at antenna port}
- 17/103 . . . {of 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
- 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
- 17/20 . of receivers
- 17/21 . . for calibration; for correcting measurements
- 17/23 . . Indication means, e.g. displays, alarms, audible means

17/24	. . with feedback of measurements to the transmitter	2201/70722	. . . . HSDPA/HSUPA
17/26	. . using historical data, averaging values or statistics	2201/70723	. . . . . Multi-carrier HSPA
17/27	. . for locating or positioning the transmitter	2201/70724	. . . . . UMTS
17/29	. . Performance testing	2201/70726	. . . . . Asynchronous CDMA
17/30	. . of propagation channels	2201/70727	. . . using fast Fourier transform
17/309	. . Measuring or estimating channel quality parameters	2201/70728	. . . Frequency aspects
17/318	. . . Received signal strength	2201/7073	. . . Direct sequence modulation synchronisation
17/327	. . . . Received signal code power [RSCP]	2201/70733	. . . . 2D search
17/336	. . . Signal-to-interference ratio [SIR] or carrier-to-interference ratio [CIR]	2201/70736	. . . . DSA
17/345	. . . Interference values (H04B 17/336 takes precedence)	2201/7097	. . . Direct sequence modulation interference
17/354	. . . Adjacent channel leakage power	2201/709709	. . . . Methods of preventing interference
17/364	. . . Delay profiles	2201/709718	. . . . Determine interference
17/373	. . Predicting channel quality parameters	2201/709727	. . . . GRAKE type RAKE receivers
17/382	. . for resource allocation, admission control or handover	2201/709736	. . . . Hybrid interference mitigation schemes
17/391	. . Modelling the propagation channel	2201/709745	. . . . Iterative interference mitigation schemes
17/3911	. . . {Fading models or fading generators}	2201/709754	. . . . Blind joint detection
17/3912	. . . {Simulation models}	2201/709763	. . . . Joint detection using feedback
17/3913	. . . {Predictive models}	2201/709772	. . . . Joint detection using feedforward
17/40	. . of relay systems	2201/709781	. . . . Linear detectors for joint detection
17/401	. . {with selective localization}	2201/70979	. . . . Fat finger issues in RAKE receivers
17/402	. . . {using different frequencies}	2201/713	. . Frequency hopping
17/403	. . . . {generated by local oscillators}	2201/71307	. . . Partial band interference
17/404	. . . . {selected by local filters}	2201/71315	. . . Wide band interference
17/405	. . . . {generated by local multipliers, dividers, modulators}	2201/71323	. . . Adaptive systems
17/406	. . . {using coded addresses}	2201/7133	. . . Asymmetric systems
17/407	. . {without selective localization}	2201/71338	. . . Asynchronous systems
17/408	. . . {using successive loop-backs}	2201/71346	. . . Bluetooth
17/409	. . . {by means of resistance, voltage or current measurement}	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
2201/00	Indexing scheme relating to details of transmission systems not covered by a single group of H04B 3/00 - H04B 13/00	2203/00	Indexing scheme relating to line transmission systems
2201/69	. Orthogonal indexing scheme relating to spread spectrum techniques in general	2203/54	. Aspects of powerline communications not already covered by H04B 3/54 and its subgroups
2201/692	. . Cognitive radio	2203/5404	. . Methods of transmitting or receiving signals via power distribution lines
2201/694	. . WPAN	2203/5408	. . . using protocols
2201/696	. . relating to Downlink	2203/5412	. . . by modifying wave form of the power source
2201/698	. . relating to Uplink	2203/5416	. . . by adding signals to the wave form of the power source
2201/707	. . relating to direct sequence modulation	2203/542	. . . using zero crossing information
2201/70701	. . . featuring pilot assisted reception	2203/5425	. . . improving S/N by matching impedance, noise reduction, gain control
2201/70702	. . . Intercell-related aspects	2203/5429	. . Applications for powerline communications
2201/70703	. . . using multiple or variable rates	2203/5433	. . . Remote metering
2201/70705	. . . . Rate detection	2203/5437	. . . Wired telephone
2201/70706	. . . with means for reducing the peak-to-average power ratio	2203/5441	. . . Wireless systems or telephone
2201/70707	. . . Efficiency-related aspects	2203/5445	. . . Local network
2201/70709	. . . . with discontinuous detection	2203/545	. . . Audio/video application, e.g. interphone
2201/7071	. . . . with dynamic control of receiver resources	2203/5454	. . . Adapter and plugs
2201/70711	. . . . . with modular structure	2203/5458	. . . Monitor sensor; Alarm systems
2201/70713	. . . . Reducing computational requirements	2203/5462	. . Systems for power line communications
2201/70714	. . . . Reducing hardware requirements	2203/5466	. . . using three phases conductors
2201/70715	. . . with application-specific features		
2201/70716	. . . Quadrature		
2201/70718	. . . Particular systems or standards		
2201/70719	. . . . CDMA2000		
2201/7072	. . . . HDR		

- 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 ([OAM for WDM transmission H04J 14/0272](#))
- 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