

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H04 ELECTRIC COMMUNICATION TECHNIQUE

(NOTE omitted)

H04B TRANSMISSION (transmission systems for measured values, control or similar signals [G08C](#); coding, decoding, code conversion, in general [H03M](#); broadcast communication [H04H](#); multiplex systems [H04J](#); secret communication [H04K](#); transmission of digital information [H04L](#))

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.

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|--------|---|--------|---|
| 1/00 | <p>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 (tuning resonant circuits H03J)</p> <p>NOTE</p> <p>In this group, group H04B 1/0003 takes precedence over groups H04B 1/005 - H04B 1/76</p> | 1/0028 | . . {wherein the AD/DA conversion occurs at baseband stage} |
| | | 1/0032 | . . . {with analogue quadrature frequency conversion to and from the baseband (quadrature modulators and demodulators <u>per se</u> H03D 3/007 , H03C 3/40)} |
| | | 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 | <p>. {Software-defined radio [SDR] systems, i.e. systems wherein components typically implemented in hardware, e.g. filters or modulators/demodulators, are implemented 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)}</p> <p>WARNING</p> <p>Groups H04B 1/0003 and subgroups are not complete pending a reorganisation. See also group H04B 1/406</p> | 1/0039 | . . . {using DSP [Digital Signal Processor] quadrature modulation and demodulation} |
| | | 1/0042 | . . . {Digital filtering (H04B 1/0035 takes precedence; digital filters <u>per se</u> H03H 17/00)} |
| | | 1/0046 | . . . {Decimation, i.e. data rate reduction techniques} |
| | | 1/005 | . {adapting radio receivers, transmitters and transceivers for operation on two or more bands, i.e. frequency ranges} |
| | | 1/0053 | . . {with common antenna for more than one band} |
| | | 1/0057 | . . . {using diplexing or multiplexing filters for selecting the desired band} |
| 1/0007 | . . {wherein the AD/DA conversion occurs at radiofrequency or intermediate frequency stage} | 1/006 | . . . {using switches for selecting the desired band (H04B 1/0057 takes precedence)} |
| 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)} | 1/0064 | . . {with separate antennas for the more than one band (H04B 1/0053 takes precedence)} |
| 1/0014 | . . . {using DSP [Digital Signal Processor] quadrature modulation and demodulation} | 1/0067 | . . {with one or more circuit blocks in common for different bands} |
| 1/0017 | . . . {Digital filtering (H04B 1/001 takes precedence; digital filters <u>per se</u> H03H 17/00)} | 1/0071 | . . . {using a common intermediate frequency for more than one band (H04B 1/0075 takes precedence)} |
| 1/0021 | . . . {Decimation, i.e. data rate reduction techniques (H04B 1/0025 takes precedence)} | 1/0075 | . . . {using different intermediate frequencies for the different bands} |
| 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)} | 1/0078 | {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 (spatial arrangements of component circuits in radio pills for living beings [A61B 5/07](#))
- 1/03 . . Constructional details, e.g. casings, housings {(adapted for airplanes [B64D](#))}
- 1/034 . . . Portable transmitters {(distress beacons [G01S 1/68](#); means for indicating the location of accidentally buried persons [A63B 29/021](#))}
- 1/0343 {to be carried on the body}
- 1/0346 {Hand-held transmitters}
- 1/036 . . . Cooling arrangements (cooling transformers [H01F 27/08](#); cooling discharge tubes [H01J 7/24](#), [H01J 19/74](#))
- 1/04 . . Circuits (of television transmitters [H04N 5/38](#); {oscillators [H03B](#); modulators [H03C 1/00](#), [H03C 3/00](#), [H03C 5/00](#); amplifiers [H03F](#); power supplies [H04B 1/1607](#))}
- 2001/0408 {with power amplifiers}
- 2001/0416 {having gain or transmission power control}
- 2001/0425 {with linearisation using predistortion}
- 2001/0433 {with linearisation using feedback}
- 2001/0441 {with linearisation using feed-forward}
- 2001/045 {with means for improving efficiency}
- 1/0458 . . . {Arrangements for matching and coupling between power amplifier and antenna or between amplifying stages (matching circuits in general [H03H](#))}
- 1/0466 . . . {Fault detection or indication ([H04B 1/0483](#) takes precedence)}
- 1/0475 . . . {with means for limiting noise, interference or distortion ([H04B 1/0483](#) takes precedence)}
- 1/0483 . . . {Transmitters with multiple parallel paths}
- 2001/0491 . . . {with frequency synthesizers, frequency converters or modulators}
- 1/06 . Receivers (control of amplification [H03G](#); television receivers [H04N 5/44](#), [H04N 5/64](#))
- 1/08 . . Constructional details, e.g. cabinet
- 1/082 . . . {to be used in vehicles ([H04B 1/086](#) takes precedence; holding or mounting accessories [B60R 11/02](#))}
- 2001/084 {with removable front panel}
- 1/086 . . . {Portable receivers}
- 1/088 {with parts of the receiver detachable or collapsible}
- 1/10 . . Means associated with receiver for limiting or suppressing noise or interference {induced by transmission (interference reduction in spread spectrum systems [H04B 1/7097](#); equalising on HF or IF [H04B 7/005](#); diversity systems [H04B 7/02](#); elimination of image frequencies [H03D 7/18](#); noise suppression by control of amplification [H03G 3/00](#), [H03G 5/00](#), [H03G 7/00](#); squelching [H03G 3/26](#), [H03G 3/34](#))}
- 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](#))}
- 1/1018 . . . {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 {(balancing ripple filters [H04B 15/005](#), [H02M 1/143](#))}
- 1/123 {using adaptive balancing or compensation means (adaptive filter circuits and algorithms [H03H](#))}
- 1/126 {having multiple inputs, e.g. auxiliary antenna for receiving interfering signal (aerials in general [H01Q](#))}
- 1/14 . . . Automatic detuning arrangements
- 1/16 . . Circuits {(demodulators [H03D](#))}
- 1/1607 . . . {Supply circuits (converters [H02M](#); filters therefor [H02M 1/14](#); voltage stabilisers [G05F 1/46](#))}
- 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](#))}
- 1/1623 {using tubes}
- 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](#))}
- 1/1638 . . . {Special circuits to enhance selectivity of receivers not otherwise provided for (resonant circuits [H03H](#))}
- 1/1646 . . . {adapted for the reception of stereophonic signals}
- 1/1653 {Detection of the presence of stereo signals and pilot signal regeneration}
- 1/1661 {Reduction of noise by manipulation of the baseband composite stereophonic signal or the decoded left and right channels}
- 1/1669 {of the demodulated composite stereo signal}

- 1/1676 {of the sum or difference signal}
- 1/1684 {of the decoded left or right stereo channel}
- 1/1692 {using companding of the stereo difference signal, e.g. FMX (volume compression or expansion in amplifiers [H03G 7/00](#))}
- 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](#))
- 1/20 for coupling gramophone pick-up, recorder output, or microphone to receiver {, e.g. for Hi-Fi systems or audio/video combinations (constructional details for associated working of receivers and recording devices [G11B 31/003](#); for television signals only [H04N 5/00](#))}
- 1/202 {by remote control}
- 1/205 {with control bus for exchanging commands between units}
- 1/207 {with an audio or audio/video bus for signal distribution ([H04B 1/205](#) takes precedence)}
- 1/22 for receivers in which no local oscillation is generated
- 1/24 the receiver comprising at least one semiconductor device having three or more electrodes
- 1/26 for superheterodyne receivers (multiple frequency-changing [H03D 7/16](#))
- 1/28 the receiver comprising at least one semiconductor device having three or more electrodes
- 1/30 for homodyne or synchrodyne receivers (demodulator circuits [H03D 1/22](#))
- 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
- WARNING**
- Group [H04B 1/3818](#) is incomplete pending reclassification of documents from group [H04B 1/3816](#)
- Until reclassification is complete, groups [H04B 1/3816](#) and [H04B 1/3818](#) should be considered in order to perform a complete search
- 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 (relay systems [H04B 7/14](#))
WARNING
 contains no documents, see provisionally [G01S 13/74](#)
- 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 {(for optical transmitters [H04B 10/58](#))}
- 1/64 . . Volume compression or expansion arrangements {(for amplifiers [H03G 7/00](#))}
- 1/66 . for reducing bandwidth of signals (in pictorial communication systems [H04N](#)); for improving efficiency of transmission ([H04B 1/68](#) takes precedence; {vocoders [G10L](#)})
- 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 {or by using special modulation methods (modulator circuits [H03C 1/52](#), [H03C 1/60](#); single sideband receivers [H04B 1/302](#); for data transmission [H04L 27/02](#))}
- 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
WARNING
 Not complete pending the completion of reclassification; see also group [H04B 1/69](#)
- 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}	3/08	. . . . in negative-feedback path of line amplifier
2001/71367	. . . . {using a transform}	3/10	. . . by pilot signal
1/7143	. . . Arrangements for generation of hop patterns	3/11	. . . . using pilot wire (H04B 3/12 takes precedence)
1/715	. . . Interference-related aspects	3/12	. . . . in negative-feedback path of line amplifier
2001/7152	. . . . {with means for suppressing interference}	3/14	. . . characterised by the equalising network used
2001/7154	. . . . {with means for preventing interference}	3/141	. . . . {using multiequalisers, e.g. bump, cosine, Bode}
1/7156	. . . Arrangements for sequence synchronisation	3/142	. . . . {using echo-equalisers, e.g. transversal}
2001/71563	. . . . {Acquisition}	3/143	. . . . {using amplitude-frequency equalisers}
2001/71566	. . . . {Tracking}	3/144	. . . . . {fixed equalizers}
1/7163	. . using impulse radio	3/145	. . . . . {variable equalisers}
	WARNING	3/146	. . . . . {using phase-frequency equalisers}
	As from 01/04/2011 documents relating to pulse-related aspects are classified in H04B 1/717 and the backlog for such documents is continuously being reclassified from H04B 1/7163	3/147	. . . . . {fixed equalisers}
1/71632	. . . . {Signal aspects (H04B 1/7172 and H04B 1/7176 take precedence)}	3/148	. . . . . {variable equalisers}
1/71635	. . . . {Transmitter aspects (H04B 1/7174 takes precedence)}	3/16	. . . characterised by the negative-impedance network used
1/71637	. . . . {Receiver aspects (H04B 1/7183 takes precedence)}	3/18	. . . . wherein the network comprises semiconductor devices
1/717	. . . Pulse-related aspects	3/20	. . Reducing echo effects or singing; Opening or closing transmitting path; Conditioning for transmission in one direction or the other
	WARNING	3/21	. . . using a set of bandfilters
	Not complete pending the completion of reclassification; see also group H04B 1/7163	3/23	. . . using a replica of transmitted signal in the time domain, e.g. echo cancellers
1/7172	. . . . {Pulse shape (in general H04L 25/03834)}	3/231	. . . . {Echo cancellers using readout of a memory to provide the echo replica}
1/7174	. . . . {Pulse generation (in general H04L 25/03834)}	3/232	. . . . {using phase shift, phase roll or frequency offset correction}
1/7176	. . . Data mapping, e.g. modulation	3/234	. . . . . {using double talk detection}
1/7183	. . . Synchronisation	3/235	. . . . . {combined with adaptive equaliser}
1/719	. . . Interference-related aspects	3/237	. . . . . {using two adaptive filters, e.g. for near end and for end echo cancelling}
1/72	. Circuits or components for simulating antennas, e.g. dummy antennas	3/238	. . . . . {using initial training sequence}
	WARNING	3/26	. . Improving frequency characteristic by the use of loading coils (loading coils per se H01F 17/08)
	contains no documents, see H03H , e.g. H03H 7/38 , H03H 11/28	3/28	. . Reducing interference caused by currents induced in cable sheathing or armouring
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)}	3/30	. . Reducing interference caused by unbalance current in a normally balanced line
1/745	. . {using by-passing or self-healing methods}	3/32	. . Reducing cross-talk, e.g. by compensating
1/76	. Pilot transmitters or receivers for control of transmission or for equalising	3/34	. . . by systematic interconnection of lengths of cable during laying; by addition of balancing components to cable during laying
3/00	Line transmission systems (combined with near-field transmission systems H04B 5/00; constructional features of cables H01B 11/00)	3/36	. . Repeater circuits (H04B 3/58 takes precedence; amplifiers therefor H03F)
3/02	. Details	3/38	. . . for signals in two different frequency ranges transmitted in opposite directions over the same transmission path
3/03	. . Hybrid circuits (for transceivers H04B 1/52 , H04B 1/58 ; hybrid junctions of the waveguide type H01P 5/16)	3/40	. . Artificial lines; Networks simulating a line of certain length
	WARNING	3/42	. . Circuits for by-passing of ringing signals
	not used, see H04B 1/52 , H04B 1/58	3/44	. . Arrangements for feeding power to a repeater along the transmission line
3/04	. . Control of transmission; Equalising (control of amplification in general H03G)	3/46	. . Monitoring; Testing
3/06	. . . by the transmitted signal	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 (amplifiers therefor [H03F](#))
- 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
- 7/0408 . . . using two or more beams, i.e. beam diversity
- 7/0413 . . . MIMO systems
- WARNING**
- Group [H04B 7/0413](#) and subgroups are not complete pending reorganisation. See also [H04W 52/42](#)
- 7/0417 Feedback systems
- 7/0421 {utilizing implicit feedback, e.g. steered pilot signals}
- 7/0426 Power distribution
- 7/043 {using best eigenmode, e.g. beam forming or beam steering}
- 7/0434 {using multiple eigenmodes}
- 7/0439 {utilizing channel inversion}
- 7/0443 {utilizing "waterfilling" technique}
- 7/0447 {utilizing uniform distribution}
- 7/0452 Multi-user MIMO systems
- 7/0456 Selection of precoding matrices or codebooks, e.g. using matrices antenna weighting
- 7/046 {taking physical layer constraints into account}
- 7/0465 {taking power constraints at power amplifier or emission constraints, e.g. constant modulus, into account}
- 7/0469 {taking special antenna structures, e.g. cross polarized antennas into account}
- 7/0473 {taking constraints in layer or codeword to antenna mapping into account}
- 7/0478 {Special codebook structures directed to feedback optimization}
- 7/0482 {Adaptive codebooks}
- 7/0486 {taking channel rank into account}
- 7/0491 . . . using two or more sectors, i.e. sector diversity
- 7/0495 using overlapping sectors in the same base station to implement MIMO for antennas
- 7/06 . . . at the transmitting station

7/0602	. . . . .	{using antenna switching (H04B 7/0686 takes precedence; antenna beam directivity switching H01Q 3/24)}	7/0671	. . . . .	{using different delays between antennas}
7/0604	. . . . .	{with predefined switching scheme}	7/0673	. . . . .	{using feedback from receiving side}
7/0606	. . . . .	{Random or pseudo-random switching scheme}	7/0676	. . . . .	{using random or pseudo-random delays}
7/0608	. . . . .	{Antenna selection according to transmission parameters}	7/0678	. . . . .	{using different spreading codes between antennas (code allocation H04J 13/16)}
7/061	. . . . .	{using feedback from receiving side}	7/068	. . . . .	{using space frequency diversity (space-frequency coding H04L 1/0606)}
7/0613	. . . . .	{using simultaneous transmission (H04B 7/0686 takes precedence)}	7/0682	. . . . .	{using phase diversity (e.g. phase sweeping)}
7/0615	. . . . .	{of weighted versions of same signal}	7/0684	. . . . .	{using different training sequences per antenna}
7/0617	. . . . .	{for beam forming}	7/0686	. . . . .	{Hybrid systems, i.e. switching and simultaneous transmission}
7/0619	. . . . .	{using feedback from receiving side (feedback signaling for adaptive modulation/coding H04L 1/0001)}	7/0689	. . . . .	{using different transmission schemes, at least one of them being a diversity transmission scheme}
7/0621	. . . . .	{Feedback content}	7/0691	. . . . .	{using subgroups of transmit antennas}
7/0623	. . . . .	{Auxiliary parameters, e.g. power control [PCB] or not acknowledged commands [NACK], used as feedback information}	7/0693	. . . . .	{switching off a diversity branch, e.g. to save power}
7/0626	. . . . .	{Channel coefficients, e.g. channel state information [CSI]}	7/0695	. . . . .	{using beam selection}
7/0628	. . . . .	{Diversity capabilities}	7/0697	. . . . .	{using spatial multiplexing}
7/063	. . . . .	{Parameters other than those covered in groups H04B 7/0623 - H04B 7/0634 , e.g. channel matrix rank or transmit mode selection}	7/08	. . . . .	at the receiving station
7/0632	. . . . .	{Channel quality parameters, e.g. channel quality indicator [CQI]}	7/0802	. . . . .	{using antenna selection (H04B 7/0868 takes precedence; antenna beam directivity switching H01Q 3/24)}
7/0634	. . . . .	{Antenna weights or vector/matrix coefficients}	7/0805	. . . . .	{with single receiver and antenna switching (H04B 7/0822 takes precedence)}
7/0636	. . . . .	{Feedback format}	7/0808	. . . . .	{comparing all antennas before reception}
7/0639	. . . . .	{Using selective indices, e.g. of a codebook, e.g. pre-distortion matrix index [PMI] or for beam selection}	7/0811	. . . . .	{during preamble or gap period}
7/0641	. . . . .	{Differential feedback}	7/0814	. . . . .	{based on current reception conditions, e.g. switching to different antenna when signal level is below threshold}
7/0643	. . . . .	{Feedback on request}	7/0817	. . . . .	{with multiple receivers and antenna path selection}
7/0645	. . . . .	{Variable feedback}	7/082	. . . . .	{selecting best antenna path}
7/0647	. . . . .	{Variable feedback rate}	7/0822	. . . . .	{according to predefined selection scheme}
7/065	. . . . .	{Variable contents, e.g. long-term or short-short}	7/0825	. . . . .	{with main and with auxiliary or diversity antennas}
7/0652	. . . . .	{Feedback error handling}	7/0828	. . . . .	{with delay elements in antenna paths}
7/0654	. . . . .	{at the receiver, e.g. antenna verification at mobile station}	7/0831	. . . . .	{Compensation of the diversity switching process for non-uniform properties or faulty operations of the switches used in the diversity switching process}
7/0656	. . . . .	{at the transmitter, e.g. error detection at base station}	7/0834	. . . . .	{based on external parameters, e.g. subscriber speed or location}
7/0658	. . . . .	{Feedback reduction}	7/0837	. . . . .	{using pre-detection combining (H04B 7/0868 takes precedence)}
7/066	. . . . .	{Combined feedback for a number of channels, e.g. over several subcarriers like in orthogonal frequency division multiplexing [OFDM]}	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)}
7/0663	. . . . .	{using vector or matrix manipulations}	7/0842	. . . . .	{Weighted combining}
7/0665	. . . . .	{Feed forward of transmit weights to the receiver}	7/0845	. . . . .	{per branch equalization, e.g. by an FIR-filter or RAKE receiver per antenna branch (rake receivers as such H04B 1/7115)}
7/0667	. . . . .	{of delayed versions of same signal (using space-time coding H04L 1/0618)}	7/0848	. . . . .	{Joint weighting}
7/0669	. . . . .	{using different channel coding between antennas (space-time coding H04L 1/0618)}			

- 7/0851 {using training sequences or error signal ([minimizing error signal H04B 7/0854](#))}
- 7/0854 {using error minimizing algorithms, e.g. minimum mean squared error [MMSE], "cross-correlation" or matrix inversion}
- 7/0857 {using maximum ratio combining techniques, e.g. signal-to-interference ratio [SIR], received signal strength indication [RSS]}
- 7/086 {using weights depending on external parameters, e.g. direction of arrival [DOA], predetermined weights or beamforming}
- 7/0862 {receiver computing weights based on information from the transmitter}
- 7/0865 {Independent weighting, i.e. weights based on own antenna reception parameters}
- 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}
- 7/0891 {Space-time diversity ([rake receivers H04B 1/7115](#); [space-time decoding H04L 1/0631](#))}
- 7/0894 {using different delays between antennas}
- 7/0897 {using beamforming per multi-path, e.g. to cope with different directions of arrival [DOA] at different multi-paths}
- 7/10 . . . Polarisation diversity; Directional diversity
- 7/12 . . . Frequency diversity
- 7/14 . . . Relay systems
- 7/145 . . . Passive relay systems
- 7/15 . . . Active relay systems
- 7/155 . . . Ground-based stations ([H04B 7/204](#) takes precedence {; for satellite systems [H04B 7/18517](#)})
- 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](#))}
- 7/15514 {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](#))}
- 7/15528 {Control of operation parameters of a relay station to exploit the physical medium}
- 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](#))}
- 7/15542 {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](#))}
- 7/1555 {Selecting relay station antenna mode, e.g. selecting omnidirectional -, directional beams, selecting polarizations}
- 7/15557 {Selecting relay station operation mode, e.g. between amplify and forward mode, decode and forward mode or FDD - and TDD mode}
- 7/15564 {Relay station antennae loop interference reduction}
- 7/15571 {by signal isolation, e.g. isolation by frequency or by antenna pattern, or by polarization}
- 7/15578 {by gain adjustment}
- 7/15585 {by interference cancellation}
- 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}
- 7/18589 {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}
- 7/2125 {Synchronisation}
- 7/2126 {using a reference station}
- 7/2128 {Changing of the reference station}
- 7/216 Code division or spread-spectrum multiple access ({CDMA, SSMA} ; spread spectrum techniques in general [H04B 1/69](#))
- 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)}
- 7/2606 {Arrangements for base station coverage control, e.g. by using relays in tunnels}
- 7/2609 {Arrangements for range control, e.g. by using remote antennas}
- 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](#))}
- 7/2615 {using hybrid frequency-time division multiple access [FDMA-TDMA]}
- 7/2618 {using hybrid code-time division multiple access [CDMA-TDMA]}
- 7/2621 {using frequency division multiple access [FDMA] ([H04B 7/2615](#) takes precedence)}
- 7/2625 {using common wave}
- 7/2628 {using code-division multiple access [CDMA] or spread spectrum multiple access [SSMA] ([H04B 7/2618](#) takes precedence)}
- 7/2631 {for broadband transmission}
- 7/2634 {for channel frequency control}
- 7/2637 {for logical channel control}
- 7/264 {for data rate control}
- 7/2643 {using time-division multiple access [TDMA] ([H04B 7/2615](#), [H04B 7/2618](#) take precedence)}
- 7/2646 {for broadband transmission}
- 7/265 {for channel frequency control}
- 7/2653 {for logical channel control}
- 7/2656 {for structure of frame, burst}
- 7/2659 {for data rate control}
- 7/2662 {Arrangements for Wireless System Synchronisation}
- 7/2665 {Arrangements for Wireless Frequency Division Multiple Access [FDMA] System Synchronisation}
- 7/2668 {Arrangements for Wireless Code-Division Multiple Access [CDMA] System Synchronisation, (for code acquisition [H04B 1/7075](#), for code tracking [H04B 1/7085](#))}
- 7/2671 {Arrangements for Wireless Time-Division Multiple Access [TDMA] System Synchronisation}
- 7/2675 {Frequency synchronisation}
- 7/2678 {Time synchronisation}
- 7/2681 {Synchronisation of a mobile station with one base station}
- 7/2684 {Synchronisation of a mobile station with more than one base station}
- 7/2687 {Inter base stations synchronisation}
- 7/269 {Master/slave synchronisation}
- 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}
- 7/2696 {Over the air autonomous synchronisation, e.g. by monitoring network activity ([H04B 7/2693](#) 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**
- NOTE**
- Groups [H04B 10/03](#), [H04B 10/07](#), [H04B 10/11](#), [H04B 10/25](#), [H04B 10/27](#), [H04B 10/29](#) and [H04B 10/40](#) - [H04B 10/90](#), and their subgroups are based on IPC2013.01
- 10/03 Arrangements for fault recovery
- WARNING**
- This group and its subgroups are not complete pending reclassification; see also [H04B 10/07](#) and subgroups [H04B 10/071](#) - [H04B 10/0799](#)
- 10/032 using working and protection systems ([H04J 14/0287](#) takes precedence)}
- 10/035 using loopbacks
- 10/038 using bypasses
- 10/07 Arrangements for monitoring or testing transmission systems; Arrangements for fault measurement of transmission systems
- 10/0705 {Prevention or detection of unauthorized access, e.g. tapping}
- 10/071 using a reflected signal, e.g. using optical time-domain reflectometers [OTDRs]
- 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
- WARNING**
- This group is not complete pending reclassification; see also [H04B 10/114](#) and its other subgroups
- 10/118 . . specially adapted for satellite communication
 - 10/12 . . {Transmission through light guides, e.g. optical fibres ([H04B 10/25](#) takes precedence)}
- WARNING**
- This group and its subgroups is no longer used for classification of new documents as from March 1, 2012. If not indicated differently for a particular subgroup, the backlog of its subgroups is being continuously reclassified to [H04B 10/25](#) - [H04B 10/2587](#)
- 10/14 . . {Terminal stations}
- WARNING**
- This group and its subgroups is no longer used for classification of new documents as from March 1, 2012. The backlog of this group and its subgroups is being continuously reclassified to [H04B 10/40](#) - [H04B 10/69](#)
- 10/142 . . . {Coherent homodyne or heterodyne systems}
 - 10/152 . . . {Non-coherent direct-detection systems}
 - 10/22 . . {Transmission between two stations which are mobile relative to each other}
- WARNING**
- This group and its subgroup is no longer used for classification of new documents as from March 1, 2012. The backlog of this group and its subgroup is being continuously reclassified to [H04B 10/25](#) - [H04B 10/2587](#) and [H04B 10/70](#)
- 10/225 . . {using optical fibre links}
 - 10/25 . . Arrangements specific to fibre transmission {([optical fibres per se](#), structural details of arrangements comprising optical fibres or other optical elements [G02B 6/00](#))}
- WARNING**
- This group and its subgroups are not complete pending reclassification; see also [H04B 10/12](#) and its subgroups
- 10/2503 . . {Bidirectional transmission}
 - 10/2504 . . {Transmission components ([H04B 10/40](#) takes precedence)}
 - 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](#) take precedence) ; optical dispersion compensators involving optical fibres [per se](#) [G02B 6/293](#)}
 - 10/25137 {using pulse shaping at the transmitter, e.g. pre-chirping or dispersion supported transmission [DST]}
 - 10/2519 using Bragg gratings {([Bragg gratings per se](#) [G02B 6/02076](#); devices using fibre gratings for dispersion control [per se](#) [G02B 6/29316](#))}
 - 10/2525 using dispersion-compensating fibres {(dispersion-tailored or dispersion compensation fibres [per se](#) [G02B 6/02214](#))}
 - 10/25253 {with dispersion management, i.e. using a combination of different kind of fibres in the transmission system (devices with different kinds of fibres for dispersion control [per se](#) [G02B 6/29374](#))}
 - 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 {([non-linear optical devices](#) [G02F 1/35](#))}
 - 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 {(sub-carrier multiplexing [H04J 14/0298](#))}
 - 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 ([WDM networks in general](#) [H04J 14/0278](#))}
 - 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 {(mode multiplex systems [H04J 14/04](#))}
 - 10/2587 . . using a single light source for multiple stations
 - 10/27 . . Arrangements for networking {(free-space networks [H04B 10/11](#), WDM networks [H04J 14/0278](#), specific to radio-over-fibre [H04B 10/25753](#))}
 - 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 {(fibre optical amplifiers [per se H01S 3/067](#))}
 - 10/2912 . . . {characterised by the medium used for amplification or processing}
 - 10/2914 {using lumped semiconductor optical amplifiers [SOA] (semiconductor optical amplifiers [per se H01S 5/50](#))}
 - 10/2916 {using Raman or Brillouin amplifiers (Raman or Brillouin amplifiers [per se H01S 3/302](#))}
 - 10/2918 . . . {Two-way repeaters, i.e. repeaters amplifying separate upward and downward lines}
 - 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 {(for general power control in WDM systems, [see also H04J 14/0221](#))}
 - 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}
 - 10/299 . . . Signal waveform processing, e.g. reshaping or retiming
 - 10/30 . . {Transmission systems employing beams of corpuscular radiation (arrangements for handling beams of corpuscular radiation, e.g. focusing, moderating, [G21K 1/00](#))}
- WARNING**
- This group is no longer used for classification of new documents as from March 1, 2012. The backlog of this group and its subgroups is being continuously reclassified to [H04B 10/80](#) and [H04B 10/90](#)
- 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 . . . {Multi-wavelength transmitters (WDM systems in general [H04J 14/02](#))}
 - 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 {, e.g. polarization switching or transmission of a single data stream on two orthogonal polarizations (polarization multiplexed systems [H04J 14/06](#))}
 - 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 {i.e., optical receivers using an optical local oscillator ([delay line interferometer based DPSK optical receivers H04B 10/677](#))}
- 10/611 . . . {Intradyn, i.e., coherent receivers with a free running local oscillator having a frequency close but not phase-locked to the carrier signal}
- 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 ([adjustment of the frequency or phase of the local oscillator in homodyne receivers H04B 10/63](#), [use of polarization beam splitters H04B 10/614](#))}
- 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 {Polarization demultiplexing, tracking or alignment of orthogonal polarization components ([polarisation multiplex systems H04J 14/06](#))}
- 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 [IF] is obtained}
- 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
- WARNING**
This group is not complete pending reclassification; see also [H04B 10/30](#)
- 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 ([power feeding arrangements in general H04B 3/44](#))}
- 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
- WARNING**
This group is not complete pending reclassification; see also [H04B 10/30](#)
- 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	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)
13/005	. {Transmission systems in which the medium consists of the human body}	17/0082	. {using service channels; using auxiliary channels}
13/02	. Transmission systems in which the medium consists of the earth or a large mass of water thereon, e.g. earth telegraphy (line transmission systems with earth or water return H04B 3/00 ; {geophysics, detecting hidden masses G01H , G01V 1/16 , G01V 1/18 , G01V 3/00 ; sonars G01S 1/72 ; applications of earth currents G01S 1/72 , H05F 7/00 ; direction and distance determination with lead cables G01S 13/00)}	17/0085	. . {using test signal generators}
14/00	Transmission systems not characterised by the medium used for transmission (details thereof H04B 1/00)	17/0087	. . {using auxiliary channels or channel simulators}
14/002	. {characterised by the use of a carrier modulation (using subcarrier modulation H04B 14/08)}	17/10	. of transmitters
14/004	. . {Amplitude modulation}	17/101	. . {for measurement of parameters}
14/006	. . {Angle modulation}	17/102	. . . {of radiated power at antenna port}
14/008	. . {Polarisation modulation}	17/103	. . . {of reflected power, e.g. return loss}
14/02	. characterised by the use of pulse modulation (in radio transmission relays H04B 7/17 ; transmission of digital information per se H04L)	17/104	. . . {of other parameters, e.g. DC offset, delay or propagation times}
14/023	. . {using pulse amplitude modulation}	17/11	. . for calibration
14/026	. . {using pulse time characteristics modulation, e.g. width, position, interval}	17/12	. . . of transmit antennas, e.g. of the amplitude or phase
14/04	. . using pulse code modulation (analogue/digital or digital/analogue conversion per se H03M 1/00 ; {for TV signals H04N 7/24)}	17/13	. . . of power amplifiers, e.g. gain or non-linearity
14/042	. . . {Special circuits, e.g. comparators}	17/14	. . . of the whole transmission and reception path, e.g. self-test loop-back
14/044	. . . {Sample and hold circuits (in general G11C 27/02)}	17/15	. . Performance testing
14/046	. . . {Systems or methods for reducing noise or bandwidth}	17/16	. . . Test equipment located at the transmitter
14/048	. . . . {Non linear compression or expansion}	17/17	. . . Detection of non-compliance or faulty performance, e.g. response deviations (H04B 17/18 takes precedence)
14/06	. . using differential modulation, e.g. delta modulation (conversion of analogue values to or from differential modulation H03M 3/00)	17/18	. . . Monitoring during normal operation
14/062	. . . {using delta modulation or one-bit differential modulation [1DPCM]}	17/19	. . . Self-testing arrangements
14/064	. . . . {with adaptive feedback}	17/20	. of receivers
14/066	. . . {using differential modulation with several bits [NDPCM]}	17/21	. . for calibration; for correcting measurements
14/068	. . . . {with adaptive feedback}	17/23	. . Indication means, e.g. displays, alarms, audible means
14/08	. characterised by the use of a sub-carrier	17/24	. . with feedback of measurements to the transmitter
15/00	Suppression or limitation of noise or interference (by means associated with receiver H04B 1/10)	17/26	. . using historical data, averaging values or statistics
15/005	. {Reducing noise, e.g. humm, from the supply}	17/27	. . for locating or positioning the transmitter
15/02	. Reducing interference from electric apparatus by means located at or near the interfering apparatus (structural association with dynamo-electric machines H02K 11/00)	17/29	. . Performance testing
15/025	. . {Reducing interference from ignition apparatus of fuel engines (cables with high resistance H01B)}	17/30	. of propagation channels
15/04	. . the interference being caused by substantially sinusoidal oscillations, e.g. in a receiver, in a tape-recorder (reducing parasitic oscillations H03B , H03F ; screening H05K 9/00)	17/309	. . Measuring or estimating channel quality parameters
15/06	. . . by local oscillators of receivers	17/318	. . . Received signal strength
		17/327	. . . . Received signal code power [RSCP]
		17/336	. . . Signal-to-interference ratio [SIR] or carrier-to-interference ratio [CIR]
		17/345	. . . Interference values (H04B 17/336 takes precedence)
		17/354	. . . Adjacent channel leakage power
		17/364	. . . Delay profiles
		17/373	. . Predicting channel quality parameters
		17/382	. . for resource allocation, admission control or handover
		17/391	. . Modelling the propagation channel
		17/3911	. . . {Fading models or fading generators}
		17/3912	. . . {Simulation models}
		17/3913	. . . {Predictive models}
		17/40	. of relay systems
		17/401	. . {with selective localization}
		17/402	. . . {using different frequencies}
		17/403	. . . . {generated by local oscillators}
		17/404	. . . . {selected by local filters}
		17/405	. . . . {generated by local multipliers, dividers, modulators}
		17/406	. . . {using coded addresses}
		17/407	. . {without selective localization}
		17/408	. . . {using successive loop-backs}

- 17/409 . . . {by means of resistance, voltage or current measurement}
- 2201/00 Indexing scheme relating to details of transmission systems not covered by a single group of [H04B 3/00](#) - [H04B 13/00](#)**
- 2201/69 . . Orthogonal indexing scheme relating to spread spectrum techniques in general
- 2201/692 . . Cognitive radio
- 2201/694 . . WPAN
- 2201/696 . . relating to Dowlink
- 2201/698 . . relating to Uplink
- 2201/707 . . relating to direct sequence modulation
- 2201/70701 . . . featuring pilot assisted reception
- 2201/70702 . . . Intercell-related aspects
- 2201/70703 . . . using multiple or variable rates
- 2201/70705 Rate detection
- 2201/70706 . . . with means for reducing the peak-to-average power ratio
- 2201/70707 . . . Efficiency-related aspects
- 2201/70709 with discontinuous detection
- 2201/7071 with dynamic control of receiver resources
- 2201/70711 with modular structure
- 2201/70713 Reducing computational requirements
- 2201/70714 Reducing hardware requirements
- 2201/70715 . . . with application-specific features
- 2201/70716 . . . Quadrature
- 2201/70718 . . . Particular systems or standards
- 2201/70719 CDMA2000
- 2201/7072 HDR
- 2201/70722 HSDPA/HSUPA
- 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 (**not used**)
- 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 (**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

H04B

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