

## ECLA EUROPEAN CLASSIFICATION

**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) [C9412]**

### 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.

[N: **WARNING** [C1202]

The following IPC groups are not used in the internal ECLA classification scheme. Subject matter covered by these groups is classified in the following ECLA groups:

<a href="#">H04B10/04</a>	covered by	<a href="#">H04B10/50</a>
<a href="#">H04B10/06</a>	covered by	<a href="#">H04B10/60</a>
<a href="#">H04B10/08</a>	covered by	<a href="#">H04B10/07</a>
<a href="#">H04B10/10</a>	covered by	<a href="#">H04B10/11</a>
<a href="#">H04B10/13</a>	covered by	<a href="#">H04B10/2581</a>
<a href="#">H04B10/26</a>	covered by	<a href="#">H04B10/24B</a>
<a href="#">H04B10/28</a>	covered by	<a href="#">H04B10/43</a>

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**H04B1/00 Details of transmission systems, not covered by a single one of groups [H04B3/00](#) to [H04B13/00](#); Details of transmission systems not characterised by the medium used for transmission (tuning resonant circuits H03J)**

[N: **Notes**

In this group, group [H04B1/00D](#) takes precedence over groups [H04B1/00M](#) to [H04B1/76](#) [N0804]

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**H04B1/00D**

- [N: **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 H04L25/00](#); [digital modulation/demodulation H04L27/00](#); [CDMA H04B1/707](#); [TDMA H04B7/26T](#); [image transmission H04N5/00](#)) [N0804]

[N: **WARNING**

Groups [H04B1/00D](#) and subgroups are not complete pending a reorganisation. See also group [H04B1/40C4](#) [N0804]

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**H04B1/00D2**

- · [N: wherein the AD/DA conversion occurs at radiofrequency or intermediate frequency stage] [N0804]

**H04B1/00D2C**

- · · [N: Channel filtering, i.e. selecting a frequency channel within the SDR system ([multiplexing of multicarrier modulation signals being represented by different frequencies H04L5/06](#); [multiplexing of multicarrier modulation signals H04L5/02Q](#))] [N0804]

**H04B1/00D2D**

- · · [N: using DSP [Digital Signal Processor] quadrature modulation and

- demodulation] [N0804]
- H04B1/00D2F . . . [N: Digital filtering ([H04B1/00D2C](#) takes precedence; digital filters per se [H03H17/00](#))] [N0804]
- H04B1/00D2R . . . [N: Decimation, i.e. data rate reduction techniques ([H04B1/00D2S](#) takes precedence)] [N0804]
- H04B1/00D2S . . . [N: using a sampling rate lower than twice the highest frequency component of the sampled signal (for demodulation of angle-modulated signals [H03D3/00B](#))] [N0804]
- H04B1/00D6 . . [N: wherein the AD/DA conversion occurs at baseband stage] [N0804]
- H04B1/00D6A . . . [N: with analogue quadrature frequency conversion to and from the baseband (quadrature modulators and demodulators per se [H03D3/00C](#), [H03C3/40](#))] [N0804]
- H04B1/00D6C . . . [N: Channel filtering, i.e. selecting a frequency channel within a software radio system (multiplexing of multicarrier modulation signals being represented by different frequencies [H04L5/06](#); multiplexing of multicarrier modulation signals [H04L5/02Q](#))] [N0804]
- H04B1/00D6D . . . [N: using DSP [Digital Signal Processor] quadrature modulation and demodulation] [N0804]
- H04B1/00D6F . . . [N: Digital filtering ([H04B1/00D6C](#) takes precedence; digital filters per se [H03H17/00](#))] [N0804]
- H04B1/00D6R . . . [N: Decimation, i.e. data rate reduction techniques] [N0804]
- H04B1/00M . . [N: adapting radio receivers, transmitters and transceivers for operation on two or more bands, i.e. frequency ranges] [N0601]
- H04B1/00M2 . . [N: with common antenna for more than one band] [N0601]
- H04B1/00M2D . . . [N: using diplexing or multiplexing filters for selecting the desired band] [N0601]
- H04B1/00M2S . . . [N: using switches for selecting the desired band ([H04B1/00M2D](#) takes preference)] [N0601]
- H04B1/00M4 . . [N: with separate antennas for the more than one band ([H04B1/00M2](#) takes precedence)] [N0601]
- H04B1/00M6 . . [N: with one or more circuit blocks in common for different bands] [N0601]
- H04B1/00M6C . . . [N: using a common intermediate frequency for more than one band ([H04B1/00M6D](#) takes precedence)] [N0601]
- H04B1/00M6D . . . [N: using different intermediate frequencies for the different bands] [N0601]
- H04B1/00M6D2 . . . . [N: with a common intermediate frequency amplifier for the different intermediate frequencies, e.g. when using switched intermediate frequency filters] [N0601]
- H04B1/00M6L . . . [N: with a common local oscillator for more than one band] [N0601]
- H04B1/00M6L2 . . . . [N: where one band is the image frequency band of the other and the band selection is done by image rejection] [N0601]
- H04B1/00M6L4 . . . . [N: using a first intermediate frequency higher than the highest of any band received] [N0601]
- H04B1/00M6L4A . . . . . [N: using a wideband front end] [N0601]
- H04B1/00M8 . . [N: where a full band is frequency converted into another full band] [N0601]
- H04B1/02 . . Transmitters (spatial arrangements of component circuits in radio pills for living beings [A61B5/07](#))
- H04B1/03 . . Constructional details, e.g. casings, housings [N: (adapted for airplanes [B64D](#))]
- H04B1/034 . . . Portable transmitters [N: (distress beacons [G01S1/68](#); means for indicating the

- location of accidentally buried persons [A63B29/02B](#)]
- H04B1/034B . . . . [N: to be carried on the body]
- H04B1/034H . . . . [N: Hand-held transmitters]
- H04B1/036 . . . Cooling arrangements (cooling transformers [H01F27/08](#); cooling discharge tubes [H01J7/24](#), [H01J19/74](#))
- H04B1/04 . . Circuits (of television transmitters [H04N 5/38](#); [N: oscillators [H03B](#); modulators [H03C1/00](#), [H03C3/00](#), [H03C5/00](#); amplifiers [H03E](#); power supplies [H04B1/16A](#)])
- H04B1/04C . . . [N: Arrangements for matching and coupling between power amplifier and antenna or between amplifying stages (matching circuits in general [H03H](#))] [N0201]
- H04B1/04F . . . [N: Fault detection or indication ([H04B1/04P](#) takes precedence)] [N0201]
- H04B1/04L . . . [N: with means for limiting noise, interference or distortion ([H04B1/04P](#) takes precedence)] [N0201]
- H04B1/04P . . . [N: Transmitters with multiple parallel paths] [N0201]
- H04B1/06 . Receivers (control of amplification [H03G](#); television receivers [H04N5/44](#), [H04N5/64](#))
- H04B1/08 . . Constructional details, e.g. cabinet
- H04B1/08M . . . [N: to be used in vehicles ([H04B1/08P](#) takes precedence; holding or mounting accessories [B60R11/02](#))]
- H04B1/08P . . . [N: Portable receivers]
- H04B1/08P2 . . . . [N: with parts of the receiver detachable or collapsible]
- H04B1/10 . . Means associated with receiver for limiting or suppressing noise or interference [N: induced by transmission (interference reduction in spread spectrum systems [H04B1/707E](#); equalising on HF or IF [H04B7/005](#); diversity systems [H04B7/02](#); elimination of image frequencies [H03D7/18](#); noise suppression by control of amplification [H03G3/00](#), [H03G5/00](#), [H03G7/00](#); squelching [H03G3/26](#), [H03G3/34](#))] [C9909]
- H04B1/10B . . . [N: 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 [H01Q7/04](#); feeders for aerials [H01Q9/00](#))]
- H04B1/10C . . . [N: noise filters connected between the power supply and the receiver (suppression or limitation of noise from electric apparatus [H04B15/00](#); demodulation [H03D](#); ripple filters [H02M1/14](#); filters in general [95G](#), [H03H](#); power supplies [H04B1/16A](#))]
- H04B1/10E . . . [N: assessing signal quality or detecting noise/interference for the received signal]
- H04B1/10E2 . . . . [N: with automatic suppression of narrow band noise or interference, e.g. by using tuneable notch filters ([H04B1/12A](#) takes precedence; filter circuits [H03H](#))]
- H04B1/10M . . . [N: Reduction of multipath noise (by equalising [H04B7/005](#))]
- H04B1/10S . . . [N: by improving strong signal performance of the receiver when strong unwanted signals are present at the receiver input]
- H04B1/12 . . . Neutralising, balancing, or compensation arrangements [N: (balancing ripple filters [H04B15/00B](#), [H02M1/14B](#))]
- H04B1/12A . . . . [N: using adaptive balancing or compensation means (adaptive filter circuits and algorithms [H03H](#))]
- H04B1/12A2 . . . . . [N: having multiple inputs, e.g. auxiliary antenna for receiving interfering signal (aerials in general [H01Q](#))]
- H04B1/14 . . . Automatic detuning arrangements

- H04B1/16 . . Circuits [N: (demodulators [H03D](#))]
- H04B1/16A . . . [N: Supply circuits (converters 92P, 92Q, H02M; filters therefor [H02M1/14](#); voltage stabilisers [G05F1/46](#))]
- H04B1/16A2 . . . . [N: Switching on; Switching off, e.g. remotely (battery saving circuits associated with selective call operation [H04Q7/18B](#); details of power consumption reduction in a PLL, [H03L7/08C](#), [H03L7/14](#), [T03L207/08](#), [T03L207/18](#); muting amplifiers by gain control see [H03G3/34](#))] [C0008]
- H04B1/16A4 . . . . [N: using tubes]
- H04B1/16B . . . . [N: Special arrangements for the reduction of the damping of resonant circuits of receivers (amplifiers [H03F](#); negative impedance networks for line transmission systems [H04B3/16](#))]
- H04B1/16D . . . . [N: Special circuits to enhance selectivity of receivers not otherwise provided for (resonant circuits H03H)]
- H04B1/16E . . . . [N: adapted for the reception of stereophonic signals]
- H04B1/16E2 . . . . [N: Detection of the presence of stereo signals and pilot signal regeneration]
- H04B1/16E4 . . . . [N: Reduction of noise by manipulation of the baseband composite stereophonic signal or the decoded left and right channels]
- H04B1/16E4M . . . . . [N: of the demodulated composite stereo signal]
- H04B1/16E4M2 . . . . . [N: of the sum or difference signal]
- H04B1/16E4M4 . . . . . [N: of the decoded left or right stereo channel]
- H04B1/16E6 . . . . [N: using companding of the stereo difference signal, e.g. FMX (volume compression or expansion in amplifiers [H03G7/00](#))]
- H04B1/18 . . . . Input circuits, e.g. for coupling to an aerial or a transmission line (input circuits for amplifiers in general [H03E](#); coupling networks between aeriels or lines and receivers independent of the nature of the receiver [H03H](#))
- H04B1/20 . . . . for coupling gramophone pick-up, recorder output, or microphone to receiver, [N: e.g. for Hi-Fi systems or audio/video combinations (constructional details for associated working of receivers and recording devices [G11B31/00B](#); for television signals only [H04N5/00](#))] [C9605]
- H04B1/20B . . . . [N: by remote control]
- H04B1/20C . . . . [N: with control bus for exchanging commands between units] [N9605]
- H04B1/20E . . . . [N: with an audio or audio/video bus for signal distribution ([H04B1/20C](#) takes precedence)] [N9605]
- H04B1/22 . . . . for receivers in which no local oscillation is generated
- H04B1/24 . . . . . the receiver comprising at least one semiconductor device having three or more electrodes
- H04B1/26 . . . . . for superheterodyne receivers (multiple frequency-changing [H03D7/16](#))
- H04B1/28 . . . . . the receiver comprising at least one semiconductor device having three or more electrodes
- H04B1/30 . . . . . for homodyne or synchrodyne receivers (demodulator circuits [H03D1/22](#))
- H04B1/30B . . . . . [N: for single sideband receivers (demodulator circuits [H03D1/24](#))]
- H04B1/38 . . 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 [N: (construction of portable transceivers [H04B1/034](#); specially adapted to be fitted into airplanes [B64D43/00](#); paging systems [G08B3/10](#); traffic between a small number of stations with amplifiers or loudspeakers [H04M9/00A](#); selecting arrangements for radio-calling systems [H04Q7/00](#); wireless communication networks H04W)] [C0803]
- H04B1/38B . . [N: with built-in auxiliary receivers]

- H04B1/38C . . . [N: Mechanical arrangements for accommodating identification devices e.g. cards, chips; with connectors for programming identification devices]
- H04B1/38M . . . [N: for being used in vehicles ([H04B1/38P](#) takes precedence; holding or mounting accessories [B60R11/02](#))]
- H04B1/38P . . . [N: Portable transceivers]
- H04B1/38P2 . . . . [N: Hand-held transceivers]
- H04B1/38P2E . . . . [N: arrangements for reducing RF exposure to the user, e.g. by changing the shape of the transceiver while in use (means for shaping the antenna pattern [H01Q1/24A1C](#))] [N9911]
- H04B1/38P4 . . . . [N: Transceivers carried on the body, e.g. in helmets]
- H04B1/38P6 . . . . [N: Arrangements for converting portable transceivers for other use, e.g. fixed or mobile use]
- H04B1/38P8 . . . . [N: Arrangements for mounting batteries or battery chargers]
- H04B1/38P10 . . . . [N: Arrangements for carrying or protecting transceivers]
- H04B1/40 . . . Circuits
- H04B1/40A . . . . [N: for selecting or indicating operating mode] [N9412]
- H04B1/40C . . . . [N: using the same oscillator for generating the transmitter frequency as well as the receiver local oscillator frequency] [N9412]
- H04B1/40C2 . . . . . [N: with multiple discrete channels] [N9412]
- H04B1/40C4 . . . . . [N: with more than one transmission mode, e.g. analog and digital modes] [N9412]
- H04B1/40C6 . . . . . [N: the transmitter oscillator frequency being identical to the receiver local oscillator frequency] [N9412]
- H04B1/44 . . . . Transmit/receive switching ([N: in radar systems [G01S7/03C](#)]; tubes therefor [H01J17/64](#); waveguide switches [H01P1/10](#))
- H04B1/46 . . . . . by voice-frequency signals; by pilot signals [N: (echo suppression [H04B3/20](#))]
- H04B1/48 . . . . . in circuit for connecting transmitter and receiver to a common transmission path, e.g. by energy of transmitter (in radar systems [G01S](#); [N: [H04B1/46](#) takes precedence])
- H04B1/50 . . . . . using different frequencies for the two directions of communication
- H04B1/52 . . . . . Hybrid arrangements, i.e. for transition from single-path two-way transmission to single transmission on each of two path, or vice-versa [N: (multiport networks [H03H7/46](#); microwave multiplexers [H01P1/213](#))]
- H04B1/52L . . . . . . [N: with means for reducing leakage of transmitter signal into the receiver (for repeater stations [H04B7/155B](#))] [N0310]
- H04B1/54 . . . . . using the same frequency for both directions of communication ([H04B1/44](#) takes precedence)
- H04B1/56 . . . . . with provision for simultaneous communication in both directions
- H04B1/58 . . . . . Hybrid arrangements, i.e. for transition from single-path two-way transmission to single transmission on each of two paths, or vice-versa [N: (multiport networks [H03H7/48](#); for two-way amplifiers [H03F3/62](#); in multiplex communication [H04J1/10](#); balance/unbalance networks [H03H7/42](#), [H03H11/32](#); construction of transformers 95G2, H01F; conjugate coupling devices of the waveguide type [H01P5/16](#))]
- H04B1/58A . . . . . . [N: using a transformer]
- H04B1/58A1 . . . . . . . [N: with automatic balancing]
- H04B1/58B . . . . . . . [N: using a bridge network]

- H04B1/58B1 . . . . . [N: with automatic balancing]
- H04B1/58C . . . . . [N: using an electronic circuit]
- H04B1/58D . . . . . [N: using opto-couplers (light transmission systems [H04B10/00](#))]
- H04B1/58E . . . . . [N: using sampling gates]
  
- H04B1/59 . Responders; Transponders (relay systems [H04B7/14](#))  
  - [N: **WARNING**
  - [N1209]contains no documents, see provisionally [G01S13/74](#)
  - ]
  
- H04B1/60 . Supervising unattended repeaters
  
- H04B1/62 . for providing a predistortion of the signal in the transmitter and corresponding correction in the receiver, e.g. for improving the signal/noise ratio [N: (for optical transmitters [H04B10/155L](#))]
  
- H04B1/64 . . Volume compression or expansion arrangements [N: (for amplifiers [H03G7/00](#))]
  
- H04B1/66 . for reducing bandwidth of signals (in pictorial communication systems H04N); for improving efficiency of transmission ([H04B1/68](#) takes precedence; [N: vocoders 42T2B, G10L])
  
- H04B1/66B . . [N: using a time/frequency relationship, e.g. time compression or expansion]
- H04B1/66M . . [N: using psychoacoustic properties of the ear, e.g. masking effect]
- H04B1/66S . . [N: using a division in frequency subbands (for TV signals [H04N7/26H](#))] [C9412]
  
- H04B1/68 . for wholly or partially suppressing the carrier or one side band [N: or by using special modulation methods (modulator circuits [H03C1/52](#), [H03C1/60](#); single sideband receivers [H04B1/30B](#); for data transmission [H04L27/02](#))] [C9509]
  
- H04B1/69 . Spread spectrum techniques [N9412] [C1104]
- H04B1/69Z . . Hybrid techniques using combinations of two or more spread spectrum techniques [N1104]  
  - [N: **WARNING**Not complete pending the completion of reclassification; see also group [H04B1/69](#)
  - [N1104]
  - ]
  
- H04B1/707 . . using direct sequence modulation [N9412]
- H04B1/707C . . . [N: with demodulation by means of convolvers, e.g. of the SAW type (SAW convolvers in general [G06G7/195](#))] [N9412]
- H04B1/707E . . . [N: with asynchronous demodulation, i.e. not requiring code synchronisation] [N9412]
- H04B1/707Z . . . Synchronisation aspects [N1104]
- H04B1/707ZA . . . . [N: Code identification ([H04B1/708Z](#) takes precedence)] [N1104]
- H04B1/707ZB . . . . with code phase acquisition [N1104]
- H04B1/707ZA . . . . . [N: using partial detection ([H04B1/707ZL](#) takes precedence)] [N1104]
- H04B1/707ZA1 . . . . . [N: Partial correlation] [N1104]
- H04B1/707ZA3 . . . . . [N: Partial phase search] [N1104]
- H04B1/707ZC . . . . . [N: Setting of search window, i.e. range of code offsets to be searched ([H04B1/707ZL](#) takes precedence)] [N1104]

H04B1/7075E	. . . . .	[N: Setting of lock conditions, e.g. threshold] [N1104]
H04B1/7075G	. . . . .	[N: Jumping within the code, i.e. masking or slewing ( <a href="#">H04B1/7075L</a> takes precedence)] [N1104]
H04B1/7075J	. . . . .	[N: with increased resolution, i.e. higher than half a chip ( <a href="#">H04B1/7075L</a> takes precedence)] [N1104]
H04B1/7075L	. . . . .	[N: Multimode search, i.e. using multiple search strategies] [N1104]
H04B1/7077	. . . . .	Multi-step acquisition, e.g. multi-dwell, coarse-fine or validation [N1104]
H04B1/7077A	. . . . .	[N: Multi-dwell schemes, i.e. multiple accumulation times] [N1104]
H04B1/708	. . . . .	Parallel implementation [N1104]
H04B1/7083	. . . . .	Cell search, e.g. using a three-step approach [N1104]
H04B1/7085	. . . . .	using a code tracking loop, e.g. a delay-locked loop [N1104]
H04B1/7087	. . . . .	Carrier synchronisation aspects [N1104]
H04B1/709	. . . . .	Correlator structure [N1104]
H04B1/7093	. . . . .	Matched filter type [N1104]
H04B1/7095	. . . . .	Sliding correlator type [N1104]
H04B1/7097	. . . . .	Interference-related aspects [N1104]
H04B1/71	. . . . .	the interference being narrowband interference [N1104]
H04B1/71E	. . . . .	[N: with estimation filters] [N1104]
H04B1/71T	. . . . .	[N: with transform to frequency domain] [N1104]
H04B1/7103	. . . . .	the interference being multiple access interference [N1104]
H04B1/7105	. . . . .	Joint detection techniques, e.g. linear detectors [N1104]
H04B1/7105A	. . . . .	[N: using decorrelation matrix] [N1104]
H04B1/7105C	. . . . .	[N: using minimum mean squared error [MMSE] detector] [N1104]
H04B1/7105E	. . . . .	[N: using maximum-likelihood sequence estimation [MLSE]] [N1104]
H04B1/7107	. . . . .	Subtractive interference cancellation [N1104]
H04B1/7107A	. . . . .	[N: Successive interference cancellation] [N1104]
H04B1/7107B	. . . . .	[N: Parallel interference cancellation] [N1104]
H04B1/711	. . . . .	the interference being multi-path interference [N1104]
H04B1/7113	. . . . .	Determination of path profile [N1104]
H04B1/7115	. . . . .	Constructive combining of multi-path signals, i.e. RAKE receivers [N1104]
H04B1/7117	. . . . .	Selection, re-selection, allocation or re-allocation of paths to fingers, e.g. timing offset control of allocated fingers [N1104]
H04B1/712	. . . . .	Weighting of fingers for combining, e.g. amplitude control or phase rotation using an inner loop [N1104]
H04B1/713	. . . . .	using frequency hopping [N9412]
H04B1/7136	. . . . .	Arrangements for generation of hop frequencies, e.g. using a bank of frequency sources, using continuous tuning or using a transform [N1104]
H04B1/7143	. . . . .	Arrangements for generation of hop patterns [N1104]
H04B1/715	. . . . .	Interference-related aspects [N1104]
H04B1/7156	. . . . .	Arrangements for sequence synchronisation [N1104]
H04B1/7163	. . . . .	using impulse radio [N1104]

[N: **WARNING**As from 01/04/2011 documents relating to pulse-related aspects are classified in [H04B1/717](#) and the backlog for such documents is continuously being reclassified from [H04B1/7163](#)

- [N1104]  
]
- H04B1/7163A . . . [N: Signal aspects ([H04B1/717A](#) and [H04B1/7176](#) take precedence)] [N1104]
  - H04B1/7163C . . . [N: Transmitter aspects ([H04B1/717C](#) takes precedence)] [N1104]
  - H04B1/7163E . . . [N: Receiver aspects ([H04B1/7183](#) takes precedence)] [N1104]
  - H04B1/717 . . . Pulse-related aspects [N1104]
- [N: **WARNING**Not complete pending the completion of reclassification; see also group [H04B1/7163](#)  
[N1104]  
]
- H04B1/717A . . . . [N: Pulse shape (in general [H04L25/03E1](#))] [N1104]
  - H04B1/717C . . . . [N: Pulse generation (in general [H04L25/03E1](#))] [N1104]
  - H04B1/7176 . . . Data mapping, e.g. modulation [N1104]
  - H04B1/7183 . . . Synchronisation [N1104]
  - H04B1/719 . . . Interference-related aspects [N1104]
- H04B1/72 . Circuits or components for simulating aerials, e.g. dummy aerial ([dissipative waveguide terminations H01P1/26](#))
- [N: **WARNING**  
[N1209] contains no documents, see H03H, e.g. [H03H7/38](#), [H03H11/28](#)  
]
- H04B1/74 . for increasing reliability, e.g. using redundant or spare channels or apparatus [N: ([replacing by standby devices for amplifiers H03F1/52](#), [H03F1/54B](#))]
  - H04B1/74B . . [N: using by-passing or self-healing methods]
  - H04B1/76 . Pilot transmitters or receivers for control of transmission or for equalising
- H04B3/00** **Line transmission systems** (combined with near-field transmission systems [H04B5/00](#); constructional features of cables [H01B11/00](#))
- H04B3/02 . Details
  - H04B3/03 . . Hybrid circuits (for transceivers [H04B1/52](#), [H04B1/58](#); hybrid junctions of the waveguide type [H01P5/16](#))
- [N: **WARNING**  
[N1209]not used, see [H04B1/52](#), [H04B1/58](#)  
]
- H04B3/04 . . Control of transmission; Equalising ([control of amplification in general H03G](#))
  - H04B3/06 . . . by the transmitted signal
  - H04B3/08 . . . . in negative-feedback path of line amplifier
  - H04B3/10 . . . by pilot signal
  - H04B3/11 . . . . using pilot wire ([H04B3/12](#) takes precedence)
  - H04B3/12 . . . . in negative-feedback path of line amplifier
  - H04B3/14 . . . characterised by the equalising network used
  - H04B3/14A . . . . [N: using multiequalisers, e.g. bump, cosine, Bode]

- H04B3/14B . . . . [N: using echo-equalisers, e.g. transversal]
- H04B3/14C . . . . [N: using amplitude-frequency equalisers]
- H04B3/14C1 . . . . . [N: fixed equalizers]
- H04B3/14C2 . . . . . [N: variable equalisers]
- H04B3/14D . . . . . [N: using phase-frequency equalisers]
- H04B3/14D1 . . . . . [N: fixed equalisers]
- H04B3/14D2 . . . . . [N: variable equalisers]
- H04B3/16 . . . characterised by the negative-impedance network used
- H04B3/18 . . . . wherein the network comprises semiconductor devices
- H04B3/20 . . Reducing echo effects or singing; Opening or closing transmitting path;  
Conditioning for transmission in one direction or the other
- H04B3/21 . . . using a set of bandfilters
- H04B3/23 . . . using a replica of transmitted signal in the time domain, e.g. echo cancellers
- H04B3/23B . . . . [N: Echo cancellers using readout of a memory to provide the echo replica]
- H04B3/23C . . . . [N: using phase shift, phase roll or frequency offset correction]
- H04B3/23D . . . . [N: using double talk detection]
- H04B3/23E . . . . [N: combined with adaptive equaliser]
- H04B3/23F . . . . [N: using two adaptive filters, e.g. for near end and for end echo cancelling]
- H04B3/23T . . . . [N: using initial training sequence]
- H04B3/26 . . Improving frequency characteristic by the use of loading coils ([loading coils per se H01F17/08](#))
- H04B3/28 . . Reducing interference caused by currents induced in cable sheating or armouring
- H04B3/30 . . Reducing interference caused by unbalance current in a normally balanced line
- H04B3/32 . . Reducing cross-talk, e.g. by compensating
- H04B3/34 . . . by systematic interconnection of lengths of cable during laying; by addition of balancing components to cable during laying
- H04B3/36 . . Repeater circuits ([H04B3/58 takes precedence](#); [amplifiers therefor H03F](#))
- H04B3/38 . . . for signals in two different frequency ranges transmitted in opposite directions over the same transmission path
- H04B3/40 . . Artificial lines; Networks simulating a line of certain length
- H04B3/42 . . Circuits for by-passing of ringing signals
- H04B3/44 . . Arrangements for feeding power to a repeater along the transmission line
- H04B3/46 . . Monitoring; Testing
- H04B3/46B . . . [N: Testing group delay or phase shift, e.g. timing jitter ([H04B3/46 takes precedence](#))]
- H04B3/46C . . . [N: Testing crosstalk effects]
- H04B3/46D . . . [N: Testing simultaneously attenuation and group delay or phase shift]
- H04B3/46E . . . [N: Testing echo effects or singing ([reducing echo effects or singing H04B3/20](#))]
- H04B3/48 . . . Testing attenuation
- H04B3/50 . Systems for transmission between fixed stations via two-conductor transmission lines ([H04B3/54 takes precedence](#))
- H04B3/52 . Systems for transmission between fixed stations via waveguides
- H04B3/54 . Systems for transmission via power distribution lines

- H04B3/54A . . [N: the information being in digital form]
- H04B3/54B . . [N: Setting up communications; Call and signalling arrangements] [C9703]
- H04B3/54C . . [N: Combination of signalling, telemetering, protection (circuits for remote indication of supply or distribution network condition [H02J13/00](#))] [C9703]
- H04B3/54D . . [N: the power on the line being DC (arrangements for feeding power [H04B10/00P](#); extracting feeding power from signals [H04L25/02](#))] [C9703]
- H04B3/56 . . Circuits for coupling, blocking, or by-passing of signals
- H04B3/58 . . Repeater circuits (amplifiers therefor [H03F](#))
- H04B3/60 . Systems for communication between relatively movable stations, e.g. for communication with lift ([H04B3/54](#) takes precedence)

#### **H04B5/00 Near-field transmission systems, e.g. inductive loop type**

- H04B5/00B . [N: using a receiver structurally associated with a loudspeaker or an earphone]
- H04B5/00C . [N: using capacitive coupling]
- H04B5/00L . [N: using leaky or radiating cables, e.g. leaky coaxial cables or power lines for inductive transmission (leaky cables per se [H01Q13/20](#); for railways [B61L3/22](#))] [C1010]
- H04B5/00P . [N: Near field system adaptations] [N1010]
- H04B5/00P2 . . [N: for data transfer] [N1010]
- H04B5/00P4 . . [N: for power transfer] [N1010]
- H04B5/00P6 . . [N: for taking measurements, e.g. using sensor coils] [N1010]
- H04B5/00P8 . . [N: for isolation purposes] [N1010]
- H04B5/00R . [N: for use in interrogation, identification or read/write systems (record carriers [G06K7/00](#), [G06K19/00](#); for railways [B61L3/12](#))] [N1010]
- H04B5/00R2 . . [N: in RFID [Radio Frequency Identification] systems] [N1010]
- H04B5/00R4 . . [N: in transponders] [N1010]
- H04B5/00W . [N: using inductive coupling (transformers or inductances adapted for inductive coupling [H01F38/14](#))] [N1010]
- H04B5/00W2 . . [N: with antenna coils (loop aerials [H01Q7/00](#))] [N1010]
- H04B5/00W4 . . [N: with multiple coils at either side] [N1010]
- H04B5/00W6 . . [N: with one coil at each side, e.g. with primary and secondary coils] [N1010]
- H04B5/02 . using transceiver
- H04B5/04 . Calling systems, e.g. paging system
- H04B5/06 . using a portable transmitter associated with a microphone

#### **H04B7/00 Radio transmission systems, i.e. using radiation field ([H04B10/00](#), [H04B15/00](#) take precedence)**

- H04B7/00B . [N: Reducing depolarization effects]

- H04B7/005 . Control of transmission; Equalising
- H04B7/01 . Reducing phase shift
- H04B7/015 . Reducing echo effects
- H04B7/02 . Diversity systems (for direction finding [G01S3/72](#); aerial arrays or systems [H01Q](#); [N: reducing multipath interference in spread spectrum systems [H04B1/707F3](#); specially adapted for satellite systems [H04B7/185M4B](#); for telegraphy or data transmission [H04L1/02](#)) [C9909]
- H04B7/02M . . [N: Site diversity, e.g. macro-diversity (for co-located independent aerials [H04B7/04](#))] [N0111]
- H04B7/02M1 . . . [N: Cooperative use of antennas of several nodes, e.g. in coordinated multipoint or cooperative MIMO [Multiple Input Multiple Output] [N1107]
- H04B7/02M2 . . . [N: Cooperative diversity, e.g. using fixed or mobile stations as relays (cooperative coding [H04L1/00B13N](#), relays per se in CoMP [H04B7/155M](#))] [N1204]
- H04B7/02S . . [N: Spatial transmit diversity using a single antenna at the transmitter] [N1204]
- H04B7/04 . . using a plurality of spaced independent aerials
- H04B7/04A . . . [N: the mobile station comprising multiple antennas (e.g. aspects of uplink diversity)] [N1204]
- H04B7/04B . . . [N: using a plurality of beams, e.g. beam diversity] [N0111]
- H04B7/04M . . . [N: Multiple input multiple output [MIMO] systems] [N0804] [C1207]
- [N: **WARNING** [N0804]  
Group [H04B7/04M](#) and subgroups are not complete pending reorganisation.  
See also [H04B7/005B4D2](#)  
]
- H04B7/04M1 . . . . [N: Feedback systems] [N0804]
- H04B7/04M1S . . . . . [N: utilizing implicit feedback, e.g. steered pilot signals] [N0804]
- H04B7/04M3 . . . . . [N: Power distribution aspects] [N0804]
- H04B7/04M3B . . . . . [N: using best eigenmode, e.g. beam forming or beam steering] [N0804]
- H04B7/04M3M . . . . . [N: using multiple eigenmodes] [N0804]
- H04B7/04M3M1 . . . . . [N: utilizing channel inversion] [N0804]
- H04B7/04M3M3 . . . . . [N: utilizing "waterfilling" technique] [N0804]
- H04B7/04M3M5 . . . . . [N: utilizing uniform distribution] [N0804]
- H04B7/04M5 . . . . . [N: Multiple user MIMO systems] [N0804] [C1207]
- H04B7/04M7 . . . . . [N: Selection of precoding matrix or codebook, e.g. using matrices for antenna weighting (codebook-based design for spatial equalizers at the transmitter [H04L25/03M1](#))] [N1204]
- H04B7/04M7C . . . . . [N: taking physical layer constraints into account] [N1204]
- H04B7/04M7C1 . . . . . [N: taking power constraints at power amplifier or emission constraints, e.g. constant modulus, into account] [N1204]
- H04B7/04M7C3 . . . . . [N: taking special antenna structures, e.g. cross polarized antennas into account] [N1204]
- H04B7/04M7C5 . . . . . [N: taking constraints in layer or codeword to antenna mapping into account] [N1204]
- H04B7/04M7E . . . . . [N: Special codebook structures directed to feedback optimization]



H04B7/06C1F7	. . . . .	{7 dots} [N: Feedback reduction] [N0911]
H04B7/06C1F7C	. . . . .	{8 dots} [N: Combined feedback for a number of channels, e.g. over several subcarriers like in orthogonal frequency division multiplexing (OFDM)] [N0911]
H04B7/06C1F7M	. . . . .	{8 dots} [N: using vector or matrix manipulations] [N0911]
H04B7/06C1R	. . . . .	[N: Feed forward of transmit weights to the receiver] [N1204]
H04B7/06C2	. . . . .	[N: of delayed versions of same signal (using space-time coding H04L1/06T)] [N0012]
H04B7/06C2C	. . . . .	[N: using different channel coding between antennas (space-time coding H04L1/06T)]
H04B7/06C2D	. . . . .	[N: using different delays between antennas] [N0601]
H04B7/06C2F	. . . . .	[N: using feedback from receiving side] [N1204]
H04B7/06C2R	. . . . .	[N: using random or pseudo-random delays] [N1204]
H04B7/06C3	. . . . .	[N: using different spreading codes between antennas (code allocation T04J11/00B4 and T04J13/00B4)] [N0601]
H04B7/06C4	. . . . .	[N: using space frequency diversity (space-frequency coding H04L1/06F)] [N0601]
H04B7/06C5	. . . . .	[N: using phase diversity (e.g. phase sweeping)] [N0601]
H04B7/06C6	. . . . .	[N: using different training sequences per antenna] [N1204]
H04B7/06H	. . . . .	[N: Hybrid systems, i.e. switching and simultaneous transmission] [N0012]
H04B7/06H1	. . . . .	[N: using different transmission schemes, at least one of them being a diversity transmission scheme] [N0601] [C1207]
H04B7/06H2	. . . . .	[N: using subgroups of transmit antennas] [N0601]
H04B7/06H2S	. . . . .	[N: switching off a diversity branch, e.g. to save power] [N1204]
H04B7/06H3	. . . . .	[N: using beam selection] [N0601]
H04B7/06M	. . . . .	[N: using spatial multiplexing] [N0601]
H04B7/08	. . . . .	at receiving station, e.g. space diversity
H04B7/08B	. . . . .	[N: using antenna selection (H04B7/08H takes precedence; antenna beam directivity switching H01Q3/24)] [C0105]
H04B7/08B2	. . . . .	[N: with single receiver and antenna switching (H04B7/08B6 takes precedence)] [N0105]
H04B7/08B2C	. . . . .	[N: comparing all antennas before reception] [N0105]
H04B7/08B2C2	. . . . .	{7 dots} [N: during preamble or gap period] [N0105]
H04B7/08B2R	. . . . .	[N: based on current reception conditions, e.g. switching to different antenna when signal level is below threshold] [N0105]
H04B7/08B4	. . . . .	[N: with multiple receivers and antenna path selection] [N0105]
H04B7/08B4B	. . . . .	[N: selecting best antenna path] [N0105]
H04B7/08B6	. . . . .	[N: according to predefined selection scheme] [N0105]
H04B7/08B8	. . . . .	[N: with main and with auxiliary or diversity antennas] [N1107]
H04B7/08B10	. . . . .	[N: with delay elements in antenna paths] [N1107]
H04B7/08B12	. . . . .	[N: Compensation of the diversity switching process for non-uniform properties or faulty operations of the switches used in the diversity switching process] [N1107]
H04B7/08B14	. . . . .	[N: based on external parameters, e.g. subscriber speed or location] [N1107]
H04B7/08C	. . . . .	[N: using pre-detection combining (H04B7/08H takes precedence)] [N0008]

- H04B7/08C2 . . . . . [N: Equal gain combining, only phase adjustments (antenna beam scanning or forming by phase or amplitude control [H01Q3/26](#), e.g. phased arrays)] [N0008]
- H04B7/08C4 . . . . . [N: Weighted combining] [N0008]
- H04B7/08C4C . . . . . [N: per branch equalization, e.g. by an FIR-filter or RAKE receiver per antenna branch (rake receivers as such H04B1/707F3)] [N0008] [C0605]
- H04B7/08C4J . . . . . [N: Joint weighting] [N0008]
- H04B7/08C4J1 . . . . . {7 dots} [N: using training sequences or error signal (minimizing error signal [H04B7/08C4J2](#))] [N0008]
- H04B7/08C4J2 . . . . . {7 dots} [N: using error minimizing algorithms, e.g. minimum mean squared error (MMSE), "cross-correlation" or matrix inversion] [N0008]
- H04B7/08C4J3 . . . . . {7 dots} [N: using maximum ratio combining techniques, e.g. signal-to-interference ratio (SIR), received signal strength indication (RSS)] [N0008]
- H04B7/08C4P . . . . . [N: using weights depending on external parameters, e.g. direction of arrival (DOA), predetermined weights or beamforming] [N0008]
- H04B7/08C4T . . . . . [N: receiver computing weights based on information from the transmitter] [N1204]
- H04B7/08C4W . . . . . [N: Independent weighting, i.e. weights based on own antenna reception parameters] [N0008]
- H04B7/08H . . . . . [N: Hybrid systems, i.e. switching and combining] [N0008]
- H04B7/08H1 . . . . . [N: using different reception schemes, at least one of them being a diversity reception scheme] [N0601] [C1207]
- H04B7/08H2 . . . . . [N: using subgroups of receive antennas] [N0601]
- H04B7/08H2S . . . . . [N: switching off a diversity branch, e.g. to save power] [N1204]
- H04B7/08H3 . . . . . [N: using beam selection] [N0601]
- H04B7/08P . . . . . [N: using post-detection diversity] [N0008]
- H04B7/08P1 . . . . . [N: with combination] [N0008]
- H04B7/08P2 . . . . . [N: with selection] [N0008]
- H04B7/08S . . . . . [N: Space-time diversity (rake receivers H04B1/707F3; space-time decoding H04L1/06T5)] [N0008] [C0605]
- H04B7/08S1 . . . . . [N: using different delays between antennas] [N0601]
- H04B7/08S3 . . . . . [N: using beamforming per multi-path, e.g. to cope with different directions of arrival [DOA] at different multi-paths] [N0601] [C1207]
- H04B7/10 . . . . . using a single aerial system characterised by its polarisation or directive properties, e.g. polarisation diversity, direction diversity
- H04B7/12 . . . . . Frequency-diversity systems
- H04B7/14 . . . . . Relay systems (interrogator-responder radar systems [G01S13/74](#); [N: CATV (community antenna television) systems [H04H20/78](#); adapted for television [H04N7/20](#)])
- H04B7/145 . . . . . Passive relay systems [N: (construction of passive reflectors [G01S13/02A](#))]
- H04B7/15 . . . . . Active relay systems
- H04B7/155 . . . . . Ground-based stations ([H04B7/204](#) takes precedence; [N: for satellite systems [H04B7/185D6](#)])
- H04B7/155C . . . . . [N: Relay station based processing for cell extension or control of coverage area, (network planning with network coordinated processing with regard to

		cell extension <a href="#">H04W16/26</a> ; network topologies using dedicated repeater stations <a href="#">H04W84/04C4</a> ; terminal devices adapted for relaying to or from an other terminal <a href="#">H04W88/04</a> ] [N1112]
<a href="#">H04B7/155C2</a>	. . . . .	[N: for shadowing compensation (for satellite mobile telephony service systems <a href="#">H04B7/185M4D</a> )] [N1112]
<a href="#">H04B7/155D</a>	. . . . .	[N: 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 <a href="#">H04L1/00B13</a> ; network traffic management with optimizing of information sizing, e.g. header compression, by using assembly and disassembly of packets <a href="#">H04W28/06D</a> )] [N1112]
<a href="#">H04B7/155F</a>	. . . . .	[N: Control of operation parameters of a relay station to exploit the physical medium] [N1112]
<a href="#">H04B7/155F1</a>	. . . . .	[N: Control of relay amplifier gain (amplifier gain control in general <a href="#">H03G3/00</a> ; gain control reducing self - or loop interference <a href="#">H04B7/155J3</a> )] [N1112]
<a href="#">H04B7/155F2</a>	. . . . .	[N: Selecting at relay station its transmit and receive resources (selection of wireless resources by user or terminal <a href="#">H04W72/04B</a> ; arrangements affording multiple use of the transmission path by two-dimensional division of the resources <a href="#">H04L5/00A2</a> , or by allocating sub-channels <a href="#">H04L5/00C</a> )] [N1112]
<a href="#">H04B7/155F3</a>	. . . . .	[N: Selecting relay station antenna mode e.g. selecting omnidirectional -, directional beams, selecting polarizations] [N1112]
<a href="#">H04B7/155H</a>	. . . . .	[N: Selecting relay station operation mode e.g. between amplify and forward mode, decode and forward mode or FDD - and TDD mode] [N1112]
<a href="#">H04B7/155J</a>	. . . . .	[N: Relay station antennae loop interference reduction] [N1112]
<a href="#">H04B7/155J1</a>	. . . . .	[N: by signal isolation e.g. isolation by frequency or by antenna pattern, or by polarization] [N1112]
<a href="#">H04B7/155J3</a>	. . . . .	[N: by gain adjustment] [N1112]
<a href="#">H04B7/155J5</a>	. . . . .	[N: by interference cancellation] [N1112]
<a href="#">H04B7/155M</a>	. . . . .	[N: 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 <a href="#">H04B7/02M1</a> )] [N1112]
<a href="#">H04B7/165</a>	. . . . .	employing angle modulation
<a href="#">H04B7/17</a>	. . . . .	employing pulse modulation, e.g. pulse code modulation
<a href="#">H04B7/185</a>	. . . . .	Space-based or airborne stations; [N: Stations for satellite systems] ( <a href="#">H04B7/204</a> takes precedence)
<a href="#">H04B7/185B</a>	. . . . .	[N: Airborne stations] [N9408]
<a href="#">H04B7/185B2</a>	. . . . .	[N: Aircraft used as relay or high altitude atmospheric platform] [N9904] [C9908]
<a href="#">H04B7/185B4</a>	. . . . .	[N: Communications with or from aircraft, i.e. aeronautical mobile service] [N9904] [C9908]
<a href="#">H04B7/185B4B</a>	. . . . .	[N: with satellite system used as relay, i.e. aeronautical mobile satellite service] [N9908]
<a href="#">H04B7/185D</a>	. . . . .	[N: Systems using a satellite or space-based relay ( <a href="#">H04B7/185B4B</a> , <a href="#">H04B7/185F</a> take precedence; providing specific services <a href="#">H04B7/185H</a> to <a href="#">H04B7/185R</a> )] [N9908]
<a href="#">H04B7/185D2</a>	. . . . .	[N: Transmission in a satellite or space-based system] [N9908]
<a href="#">H04B7/185D4</a>	. . . . .	[N: Transmission equipment in satellites or space-based relays] [N9908]
<a href="#">H04B7/185D6</a>	. . . . .	[N: Transmission equipment in earth stations] [N9908]

H04B7/185D8	. . . . .	[N: Operations control, administration or maintenance] [N9908]
H04B7/185F	. . . . .	[N: Systems of inter linked satellites, i.e. inter satellite service (for optical links between satellites <a href="#">H04B10/105</a> )] [N9908]
H04B7/185H	. . . . .	[N: Satellite systems for providing broadcast service to terrestrial stations, i.e. broadcast satellite service (arrangements specially adapted for satellite broadcast receiving <a href="#">H04H40/90</a> ; picture transmission via satellite <a href="#">H04N1/00B4</a> ; television transmission via satellite <a href="#">H04N7/20</a> )] [N9908]
H04B7/185H2	. . . . .	[N: Arrangements for data linking, networking or transporting, or for controlling an end to end session (data switching networks <a href="#">H04L12/00</a> )] [N9908]
H04B7/185J	. . . . .	[N: 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] [N9908]
H04B7/185M	. . . . .	[N: Satellite systems for providing telephony service to a mobile station, i.e. mobile satellite service (for selecting <a href="#">H04Q7/00</a> )] [N9408] [C9908]
H04B7/185M4	. . . . .	[N: Arrangements for managing transmission, i.e. for transporting data or a signalling message] [N9908]
H04B7/185M4B	. . . . .	[N: for enhancing link reliability, e.g. satellites diversity] [N9908]
H04B7/185M4D	. . . . .	[N: Shadowing compensation therefor, e.g. by using an additional terrestrial relay] [N0003]
H04B7/185M6	. . . . .	[N: Arrangements for managing radio, resources, i.e. for establishing or releasing a connection] [N9908]
H04B7/185M6B	. . . . .	[N: for handover of resources] [N9908]
H04B7/185M6D	. . . . .	[N: for adaptation of transmission parameters, e.g. power control (for detecting or preventing errors in the information received <a href="#">H04L1/00</a> )] [N9908]
H04B7/185M8	. . . . .	[N: Arrangements for managing station mobility, i.e. for station registration or localisation] [N9908]
H04B7/185M8B	. . . . .	[N: for geolocalisation of a station ( position fixing by direction or distance determination <a href="#">G01S5/00</a> )] [N9908]
H04B7/185M8B2	. . . . .	{7 dots} [N: using a telephonic control signal, e.g. propagation delay variation, Doppler frequency variation, power variation, beam identification] [N9908]
H04B7/185M8B2B	. . . . .	{8 dots} [N: using a telephonic control signal and a second ranging satellite (determining absolute distances from a plurality of spaced points of known location <a href="#">G01S5/14</a> )] [N9908]
H04B7/185M8B4	. . . . .	{7 dots} [N: using the position provided by an existing geolocalisation system] [N9908]
H04B7/185M8D	. . . . .	[N: using a location database] [N9908]
H04B7/185M10	. . . . .	[N: Arrangements for managing communications, i.e. for setting up, maintaining or releasing a call between stations] [N9908]
H04B7/185M10B	. . . . .	[N: for call routing] [N9908]
H04B7/185M12	. . . . .	[N: Arrangements for interconnecting multiple systems (data switching networks <a href="#">H04L12/00</a> )] [N9908]
H04B7/185M14	. . . . .	[N: Arrangements for preventing unauthorised access or for providing user protection (arrangements for secret or secure communication <a href="#">H04L9/00</a> )] [N9908]
H04B7/185M16	. . . . .	[N: Arrangements for providing additional services to the basic mobile satellite telephony service] [N0005]
H04B7/185M18	. . . . .	[N: Arrangements for system physical machines management, i.e. for

		construction operations control, administration, maintenance ] [N9908]
H04B7/185M18B	. . . . .	[N: for satellites; for fixed or mobile stations] [N9908]
H04B7/185M18D	. . . . .	[N: for operations control, administration or maintenance] [N9908]
H04B7/185R	. . . . .	[N: Satellite systems for providing narrowband data service to fixed or mobile stations, e.g. using a minisatellite, a microsatellite (for selecting <a href="#">H04Q7/00</a> )] [N9908]
H04B7/185S	. . . . .	[N: Satellite systems for providing broadband data service to individual earth stations (for selecting <a href="#">H04Q7/00</a> ; provisions for broadband connection, <a href="#">H04Q11/04S2</a> )] [N9908] [C0005]
H04B7/185S4	. . . . .	[N: Arrangements for data transmission on the physical system, i.e. for data bit transmission between network components] [N9908]
H04B7/185S6	. . . . .	[N: Arrangements for data linking, i.e. for data framing, for error recovery, for multiple access] [C0005]
H04B7/185S8	. . . . .	[N: Arrangements for data networking, i.e. for data packet routing, for congestion control (data switching networks <a href="#">H04L12/00</a> )] [N9908]
H04B7/185S10	. . . . .	[N: Arrangements for data transporting, e.g. for an end to end data transport or check] [N9908]
H04B7/185S12	. . . . .	[N: Arrangements for controlling an end to end session, i.e. for initialising, synchronising or terminating an end to end link] [N9908]
H04B7/185S14	. . . . .	[N: Arrangements for interconnecting multiple systems (data switching networks <a href="#">H04L12/00</a> )] [N9908]
H04B7/185S16	. . . . .	[N: Arrangements for preventing unauthorised access or for providing user protection (arrangements for secret or secure communication <a href="#">H04L9/00</a> )] [N9908]
H04B7/185S24	. . . . .	[N: Arrangements for adapting broadband applications to satellite systems] [N0005]
H04B7/185S34	. . . . .	[N: Arrangements for system physical machines management, i.e. for construction, operations control, administration, maintenance] [N9908]
H04B7/19	. . . . .	Earth-synchronous stations
H04B7/195	. . . . .	Non-synchronous stations
H04B7/204	. . . . .	Multiple access
H04B7/204B	. . . . .	[N: Spot beam multiple access] [C9408]
H04B7/204D	. . . . .	[N: Mixed mode, TDM and FDM systems] [N9408]
H04B7/204F	. . . . .	[N: SS-FDMA, FDMA satellite switching] [N9408]
H04B7/204T	. . . . .	[N: SS-TDMA, TDMA satellite switching] [N9408]
H04B7/204T2	. . . . .	[N: Frame structure, synchronisation or frame acquisition in SS-TDMA systems] [N9408]
H04B7/208	. . . . .	Frequency-division multiple access [N: (FDMA)] [C9408]
H04B7/212	. . . . .	Time-division multiple access [N: (TDMA)] [C9408]
H04B7/212A	. . . . .	[N: Channels assignment to the different stations]
H04B7/212A1	. . . . .	[N: Variable assignment, e.g. demand assignment]
H04B7/212B	. . . . .	[N: Synchronisation]
H04B7/212B1	. . . . .	[N: using a reference station]
H04B7/212B1A	. . . . .	{7 dots} [N: Changing of the reference station]
H04B7/216	. . . . .	Code division or spread-spectrum multiple access ([N: CDMA, SSMA]; spread spectrum techniques in general <a href="#">H04B1/69</a> ) [C9412]
H04B7/22	. . . . .	Scatter propagation systems, [N: e.g. ionospheric, tropospheric or meteor scatter]

## C9909]

- H04B7/24 . for communication between two or more posts (for selecting [H04Q7/00](#); [N: wireless communication networks H04W]) [C9412] [C0803]
- H04B7/26 . . at least one of which is mobile
- H04B7/26B . . . [N: Arrangements for wireless physical layer control ([H04B7/26C](#) takes precedence)] [N0003] [C0005]
- H04B7/26B2 . . . . [N: Arrangements for base station coverage control, e.g. by using relays in tunnels]
- H04B7/26B4 . . . . [N: Arrangements for range control, e.g. by using remote antennas] [N0003]
- H04B7/26C . . . [N: Arrangements for wireless medium access control, e.g. by allocating physical layer transmission capacity ([H04B7/26D](#) to [H04B7/26T](#) take precedence; provision for broadband connection [H04Q11/04S2](#))] [N0005]
- H04B7/26D . . . [N: using hybrid frequency-time division multiple access [FDMA-TDMA]] [N0003]
- H04B7/26E . . . [N: using hybrid code-time division multiple access [CDMA-TDMA]] [N0003]
- H04B7/26F . . . [N: using frequency division multiple access [FDMA] ([H04B7/26D](#) takes precedence)] [C0003]
- H04B7/26G . . . [N: using common wave] [C0003]
- H04B7/26S . . . [N: using code-division multiple access [CDMA] or spread spectrum multiple access [SSMA] ([H04B7/26E](#) takes precedence)] [C0003]
- H04B7/26S4 . . . . [N: for broadband transmission] [N0003]
- H04B7/26S6 . . . . [N: for channel frequency control] [N0003]
- H04B7/26S8 . . . . [N: for logical channel control] [N0003]
- H04B7/26S12 . . . . [N: for data rate control] [N0003]
- H04B7/26T . . . [N: using time-division multiple access [TDMA] ([H04B7/26D](#), [H04B7/26E](#) take precedence)] [C0003]
- H04B7/26T4 . . . . [N: for broadband transmission] [N0003]
- H04B7/26T6 . . . . [N: for channel frequency control] [N0003]
- H04B7/26T8 . . . . [N: for logical channel control] [N0003]
- H04B7/26T10 . . . . [N: for structure of frame, burst] [N0003]
- H04B7/26T12 . . . . [N: for data rate control] [N0003]
- H04B7/26V . . . [N: Arrangements for Wireless System Synchronisation] [N0005]
- H04B7/26V2 . . . . [N: Arrangements for Wireless Frequency Division Multiple Access (FDMA) System Synchronisation] [N0005]
- H04B7/26V4 . . . . [N: Arrangements for Wireless Code-Division Multiple Access (CDMA) System Synchronisation, for code acquisition [H04B1/707A](#), for code tracking [H04B1/707B](#)] [N0005] [C0209]
- H04B7/26V6 . . . . [N: Arrangements for Wireless Time-Division Multiple Access (TDMA) System Synchronisation] [N0005]
- H04B7/26V6B . . . . . [N: Frequency synchronisation] [N0005]
- H04B7/26V6D . . . . . [N: Time synchronisation] [N0005]
- H04B7/26V6D2 . . . . . . [N: Synchronisation of a mobile station with one base station] [N0005]
- H04B7/26V6D4 . . . . . . [N: Synchronisation of a mobile station with more than one base station] [N0005]
- H04B7/26V6D6 . . . . . . [N: Inter base stations synchronisation] [N0005]

- H04B7/26V6D6B . . . . . {7 dots} [N: Master/slave synchronisation] [N0005]
- H04B7/26V6D6D . . . . . {7 dots} [N: 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] [N0005]
- H04B7/26V6D6F . . . . . {7 dots} [N: Over the air autonomous synchronisation, e.g. by monitoring network activity ([H04B7/26V6D6D](#) takes preference)] [N0005]

**H04B10/00**      **Transmission systems employing electromagnetic waves other than radio-waves, e.g. infrared, visible or ultraviolet light, or employing corpuscular radiation, e.g. quantum communication [C1202]**

[N: **WARNING**[N1202]

Group [H04B10/2572](#) does not correspond to former or current IPC groups. Concordance CPC:IPC for this group is as follows: - [H04B10/2572](#) : [H04B10/2507](#)

]

[N: **Notes**[N1202]

Groups [H04B10/03](#), [H04B10/07](#), [H04B10/11](#), [H04B10/25](#), [H04B10/27](#), [H04B10/29](#) and [H04B10/40](#) to [H04B10/90](#), and their subgroups are based on IPC2013.01

]

- H04B10/03 . Arrangements for fault recovery [N1202] [C1203]

[N: **WARNING**[N1202]

This group and its subgroups are not complete pending reclassification; see also [H04B10/07](#) and subgroups [H04B10/071](#) - [H04B10/0799](#)

]

- H04B10/032 . . using working and protection systems [N: (H04J14/02P takes precedence)] [N1204]
- H04B10/035 . . using loopbacks [N1202]
- H04B10/038 . . using bypasses [N1202]
- H04B10/07 . Arrangements for monitoring or testing transmission systems; Arrangements for fault measurement of transmission systems [N1202] [C1203]
- H04B10/07S . . [N: Prevention or detection of unauthorized access, e.g. tapping] [N1202]
- H04B10/071 . . using a reflected signal, e.g. using optical time-domain reflectometers [OTDRs] [N1202]
- H04B10/073 . . using an out-of-service signal (H04B 10/071 takes precedence) [N1202]
- H04B10/0731 . . . [N: Testing or characterisation of optical devices, e.g. amplifiers] [N1202]
- H04B10/075 . . using an in-service signal (H04B 10/071 takes precedence) [N1202]
- H04B10/077 . . . using a supervisory or additional signal [N1202]
- H04B10/0771 . . . . [N: Fault location on the transmission path] [N1202]
- H04B10/0773 . . . . [N: Network aspects, e.g. central monitoring of transmission parameters] [N1202] [C1203]
- H04B10/0775 . . . . [N: Performance monitoring and measurement of transmission parameters] [N1202]
- H04B10/0777 . . . . [N: Monitoring line amplifier or line repeater equipment] [N1202]
- H04B10/0779 . . . . [N: Monitoring line transmitter or line receiver equipment] [N1202]

- H04B10/079 . . . using measurements of the data signal [N1202]
- H04B10/0791 . . . . [N: Fault location on the transmission path] [N1202]
- H04B10/0793 . . . . [N: Network aspects, e.g. central monitoring of transmission parameters] [N1202] [C1203]
- H04B10/0795 . . . . [N: Performance monitoring; Measurement of transmission parameters] [N1202]
- H04B10/07951 . . . . . [N: Monitoring or measuring chromatic dispersion or PMD] [N1202]
- H04B10/07953 . . . . . [N: Monitoring or measuring OSNR, BER or Q] [N1202]
- H04B10/07955 . . . . . [N: Monitoring or measuring power] [N1202]
- H04B10/07957 . . . . . [N: Monitoring or measuring wavelength] [N1202]
- H04B10/0797 . . . . . [N: Monitoring line amplifier or line repeater equipment] [N1202]
- H04B10/0799 . . . . . [N: Monitoring line transmitter or line receiver equipment] [N1202]
  
- H04B10/11 . . Arrangements specific to free-space transmission, i.e. transmission through air or vacuum [N1202]
- H04B10/112 . . Line-of-sight transmission over an extended range [N1202]
- H04B10/1121 . . . [N: One-way transmission] [N1202]
- H04B10/1123 . . . [N: Bidirectional transmission] [N1202]
- H04B10/1125 . . . . [N: using a single common optical path] [N1202]
- H04B10/1127 . . . . [N: using two distinct parallel optical paths] [N1202]
- H04B10/1129 . . . . [N: Arrangements for outdoor wireless networking of information] [N1202]
- H04B10/114 . . Indoor or close-range type systems [N1202]
- H04B10/1141 . . . [N: One-way transmission] [N1202]
- H04B10/1143 . . . [N: Bidirectional transmission] [N1202]
- H04B10/1149 . . . [N: Arrangements for indoor wireless networking of information] [N1202]
- H04B10/116 . . . Visible light communication [N1202]
  
- [N: **WARNING**[N1202]  
This group is not complete pending reclassification; see also [H04B10/114](#) and its other subgroups  
]
- H04B10/118 . . specially adapted for satellite communication [N1202]
  
- H04B10/12 . . Transmission through light guides, e.g. optical fibres [N: ([H04B10/25](#) takes precedence) [C1203]
  
- [N: **WARNING**[N1202]  
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 [H04B10/25](#) - [H04B10/2587](#)  
]
- H04B10/14 . . Terminal stations [C1202]
  
- [N: **WARNING**[N1202]  
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 [H04B10/40](#) - [H04B10/69](#)  
]
- H04B10/142 . . . Coherent homodyne or heterodyne systems

- H04B10/152 . . . Non-coherent direct-detection systems
- H04B10/22 . Transmission between two stations which are mobile relative to each other [C1202]  
 [N: **WARNING**[N1202]  
 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 [H04B10/25](#) - [H04B10/2587](#) and [H04B10/70](#)  
 ]
- H04B10/22F . . [N: using optical fibre links]
- H04B10/25 . Arrangements specific to fibre transmission [N: (optical fibres per se, structural details of arrangements comprising optical fibres or other optical elements [G02B6/00](#) [N1202]  
 [N: **WARNING**[N1202]  
 This group and its subgroups are not complete pending reclassification; see also [H04B10/12](#) and its subgroups  
 ]
- H04B10/2503 . . [N: Bidirectional transmission] [N1202]
- H04B10/2504 . . [N: Transmission components ([H04B10/40](#) takes precedence)] [N1202]
- H04B10/2507 . . for the reduction or elimination of distortion or dispersion [N1202]
- H04B10/25073 . . . [N: using spectral equalisation, e.g. spectral filtering] [N1202]
- H04B10/25077 . . . [N: using soliton propagation] [N1202]
- H04B10/2513 . . . due to chromatic dispersion [N1202]
- H04B10/25133 . . . . [N: including a lumped electrical or optical dispersion compensator ([H04B10/2519](#), [H04B10/2525](#) take precedence); optical dispersion compensators involving optical fibres per se [G02B6/293](#) ] [N1202]
- H04B10/25137 . . . . [N: using pulse shaping at the transmitter, e.g. pre-chirping or dispersion supported transmission [DST]] [N1202]
- H04B10/2519 . . . . using Bragg gratings [N: (Bragg gratings per se [G02B6/02G8](#); devices using fibre gratings for dispersion control per se [G02B6/293D4](#))] [N1202]
- H04B10/2525 . . . . using dispersion-compensating fibres [N: (dispersion-tailored or dispersion compensation fibres per se [G02B6/02M](#))] [N1202]
- H04B10/25253 . . . . . [N: 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 [G02B6/293M4](#))] [N1202]
- H04B10/2531 . . . . using spectral inversion [N1202]
- H04B10/2537 . . . due to scattering processes, e.g. Raman or Brillouin scattering [N1202]
- H04B10/2543 . . . due to fibre non-linearities, e.g. Kerr effect [N: (non-linear optical devices [G02F1/35](#))] [N1202]
- H04B10/255 . . . . Self-phase modulation [SPM] [N1202]
- H04B10/2557 . . . . Cross-phase modulation [XPM] [N1202]
- H04B10/2563 . . . . Four-wave mixing [FWM] [N1202]
- H04B10/2569 . . . due to polarisation mode dispersion [PMD] [N1202] [C1203]
- H04B10/2572 . . . [N: due to forms of polarisation-dependent distortion other than PMD] [N1202] [C1203]
- H04B10/2575 . . Radio-over-fibre, e.g. radio frequency signal modulated onto an optical carrier [N: (sub-carrier multiplexing [H04J14/02S](#))] [N1202] [C1203]

- H04B10/25751 . . . [N: Optical arrangements for CATV or video distribution (adaptations of television systems for optical transmission [H04N7/22](#) )] [N1202]
- H04B10/25752 . . . [N: Optical arrangements for wireless networks] [N1202]
- H04B10/25753 . . . . [N: Distribution optical network, e.g. between a base station and a plurality of remote units (WDM networks in general [H04J14/02N](#))] [N1202] [M1207]
- H04B10/25754 . . . . . [N: Star network topology] [N1202]
- H04B10/25755 . . . . . [N: Ring network topology] [N1202]
- H04B10/25756 . . . . . [N: Bus network topology] [N1202]
- H04B10/25758 . . . . . [N: between a central unit and a single remote unit by means of an optical fibre] [N1202]
- H04B10/25759 . . . . . [N: Details of the reception of RF signal or the optical conversion before the optical fibre] [N1202]
- H04B10/2581 . . Multimode transmission [N: (mode multiplex systems [H04J14/04](#))] [N1202] [C1203]
- H04B10/2587 . . using a single light source for multiple stations [N1202]
- H04B10/27 . . Arrangements for networking [N: (free-space networks [H04B10/11](#), WDM networks [H04J14/02N](#), specific to radio-over-fibre [H04B10/25753](#))] [N1202] [C1203]
- H04B10/271 . . [N: Combination of different networks, e.g. star and ring configuration in the same network or two ring networks interconnected] [N1202]
- H04B10/272 . . Star-type networks [N: or tree-type networks] [N1202] [C1203]
- H04B10/2725 . . . [N: Star-type networks without a headend] [N1202]
- H04B10/275 . . Ring-type networks [N1202]
- H04B10/2755 . . . [N: Ring-type networks with a headend] [N1202]
- H04B10/278 . . Bus-type networks [N1202]
- H04B10/29 . . Repeaters [N1202] [C1203]
- H04B10/291 . . in which processing or amplification is carried out without conversion of the main signal from optical form [N: (fibre optical amplifiers per se [H01S3/067](#))] [N1202]
- H04B10/2912 . . . [N: characterised by the medium used for amplification or processing] [N1202]
- H04B10/2914 . . . . [N: using lumped semiconductor optical amplifiers [SOA] (semiconductor optical amplifiers per se [H01S5/50](#))] [N1202]
- H04B10/2916 . . . . [N: using Raman or Brillouin amplifiers (Raman or Brillouin amplifiers per se [H01S3/30E](#))] [N1202]
- H04B10/2918 . . . [N: Two-way repeaters, i.e. repeaters amplifying separate upward and downward lines] [N1202]
- H04B10/293 . . . Signal power control [N1202]
- H04B10/2931 . . . . [N: using AGC ([H04B10/294](#) takes precedence)] [N1202]
- H04B10/2933 . . . . [N: considering the whole optical path] [N1202]
- H04B10/2935 . . . . . [N: with a cascade of amplifiers] [N1202]
- H04B10/2937 . . . . . [N: 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] [N1202]
- H04B10/2939 . . . . . [N: Network aspects] [N1202]
- H04B10/294 . . . . in a multiwavelength system, e.g. gain equalisation [N: (for general power control in WDM systems, see also [H04J14/02B](#))] [N1202] [C1203]
- H04B10/2941 . . . . . [N: using an equalising unit, e.g. a filter ([H04B10/296](#) takes precedence)] [N1202]

- H04B10/2942 . . . . . [N: using automatic gain control [AGC] ([H04B10/296](#) takes precedence)] [N1202]
- H04B10/296 . . . . . Transient power control, e.g. due to channel add/drop or rapid fluctuations in the input power [N1202]
- H04B10/297 . . . . . Bidirectional amplification [N1202]
- H04B10/2971 . . . . . [N: A single amplifier for both directions] [N1202]
- H04B10/2972 . . . . . [N: Each direction being amplified separately] [N1202]
- H04B10/299 . . . . . Signal waveform processing, e.g. reshaping or retiming [N1202]
  
- H04B10/30 . . . . . Transmission systems employing beams of corpuscular radiation ([arrangements for handling beams of corpuscular radiation, e.g. focusing, moderating, G21K1/00](#) [N0408] [M1202]
- [N: **WARNING**[N1202]
- 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 [H04B10/80](#) and [H04B10/90](#) ]
  
- H04B10/40 . . . . . Transceivers [N1202]
- H04B10/43 . . . . . using a single component as both light source and receiver, e.g. using a photoemitter as a photoreceiver [N1202]
  
- H04B10/50 . . . . . Transmitters [N1202] [C1203]
- H04B10/501 . . . . . [N: Structural aspects] [N1202]
- H04B10/502 . . . . . [N: LED transmitters] [N1202]
- H04B10/503 . . . . . [N: Laser transmitters] [N1202]
- H04B10/504 . . . . . [N: using direct modulation] [N1202] [C1203]
- H04B10/505 . . . . . [N: using external modulation] [N1202]
- H04B10/5051 . . . . . [N: using a series, i.e. cascade, combination of modulators] [N1202]
- H04B10/5053 . . . . . [N: using a parallel, i.e. shunt, combination of modulators] [N1202]
- H04B10/5055 . . . . . [N: using a pre-coder] [N1202]
- H04B10/5057 . . . . . [N: using a feedback signal generated by analysing the optical output] [N1202]
- H04B10/50572 . . . . . [N: to control the modulating signal amplitude including amplitude distortion] [N1202]
- H04B10/50575 . . . . . [N: to control the modulator DC bias] [N1202]
- H04B10/50577 . . . . . [N: to control the phase of the modulating signal] [N1202]
- H04B10/5059 . . . . . [N: using a feed-forward signal generated by analysing the optical or electrical input] [N1202]
- H04B10/50593 . . . . . [N: to control the modulating signal amplitude including amplitude distortion] [N1202]
- H04B10/50595 . . . . . [N: to control the modulator DC bias] [N1203]
- H04B10/50597 . . . . . [N: to control the phase of the modulating signal] [N1202]
- H04B10/506 . . . . . [N: Multi-wavelength transmitters (**WDM systems in general** [H04J14/02](#))] [N1202] [C1203]
- H04B10/508 . . . . . Pulse generation, e.g. generation of solitons [N1202]
- H04B10/516 . . . . . Details of coding or modulation [N1202]

- H04B10/5161 . . . [N: Combination of different modulation schemes] [N1202]
- H04B10/5162 . . . [N: Return-to-zero modulation schemes] [N1202]
- H04B10/5165 . . . [N: Carrier suppressed; Single sideband; Double sideband or vestigial] [N1202]
- H04B10/5167 . . . [N: Duo-binary; Alternative mark inversion; Phase shaped binary transmission] [N1202]
- H04B10/524 . . . Pulse modulation [N1202]
- H04B10/532 . . . Polarisation modulation [N: e.g. polarization switching or transmission of a single data stream on two orthogonal polarizations (polarization multiplexed systems H04J14/06)] [N1202] [C1203]
- H04B10/54 . . . Intensity modulation [N1202]
- H04B10/541 . . . . [N: Digital intensity or amplitude modulation] [N1202]
- H04B10/548 . . . Phase or frequency modulation [N1202]
- H04B10/556 . . . . Digital modulation, e.g. differential phase shift keying [DPSK] or frequency shift keying [FSK] [N1202]
- H04B10/5561 . . . . . [N: Digital phase modulation] [N1202]
- H04B10/5563 . . . . . [N: Digital frequency modulation] [N1202]
- H04B10/564 . . . Power control [N1202]
- H04B10/572 . . . Wavelength control [N1202]
- H04B10/58 . . . Compensation for non-linear transmitter output [N1202]
- H04B10/588 . . . . in external modulation systems [N1202]
  
- H04B10/60 . Receivers [N1202] [C1203]
- H04B10/61 . . Coherent receivers [N: i.e., optical receivers using an optical local oscillator (delay line interferometer based DPSK optical receivers H04B10/677)] [N1204]
- H04B10/611 . . . [N: Intradyne, i.e., coherent receivers with a free running local oscillator having a frequency close but not phase-locked to the carrier signal] [N1204]
- H04B10/612 . . . [N: for optical signals modulated with a format different from binary or higher-order PSK [X-PSK], e.g. QAM, DPSK, FSK, MSK, ASK] [N1204]
- H04B10/613 . . . [N: including phase diversity, e.g., having in-phase and quadrature branches, as in QPSK coherent receivers] [N1204]
- H04B10/614 . . . [N: comprising one or more polarization beam splitters, e.g. polarization multiplexed [PolMux] X-PSK coherent receivers, polarization diversity heterodyne coherent receivers (H04J14/06 takes precedence) ] [N1204]
- H04B10/615 . . . [N: Arrangements affecting the optical part of the receiver (adjustment of the frequency or phase of the local oscillator in homodyne receivers H04B10/63, use of polarization beam splitters H04B10/614)] [N1204]
- H04B10/6151 . . . . [N: comprising a polarization controller at the receiver's input stage] [N1204]
- H04B10/616 . . . . [N: Details of the electronic signal processing in coherent optical receivers] [N1204]
- H04B10/6161 . . . . . [N: Compensation of chromatic dispersion] [N1204]
- H04B10/6162 . . . . . [N: Compensation of polarization related effects, e.g., PMD, PDL] [N1204]
- H04B10/6163 . . . . . [N: Compensation of non-linear effects in the fiber optic link, e.g. self-phase modulation [SPM], cross-phase modulation [XPM], four wave mixing [FWM]] [N1204]
- H04B10/6164 . . . . . [N: Estimation or correction of the frequency offset between the received optical signal and the optical local oscillator] [N1204]
- H04B10/6165 . . . . . [N: Estimation of the phase of the received optical signal, phase error estimation or phase error correction] [N1204]

- H04B10/6166 . . . . [N: Polarization demultiplexing, tracking or alignment of orthogonal polarization components (polarisation multiplex systems H04J14/06)] [N1204]
- H04B10/63 . . . Homodyne [N:, i.e., coherent receivers where the local oscillator is locked in frequency and phase to the carrier signal] [N1204]
- H04B10/64 . . . Heterodyne [N:, i.e., coherent receivers where, after the opto-electronic conversion, an electrical signal at an intermediate frequency [fIF] is obtained] [N1204]
- H04B10/66 . . Non-coherent receivers, e.g. using direct detection [N1202]
- H04B10/67 . . . Optical arrangements in the receiver [N1202]
- H04B10/671 . . . . [N: for controlling the input optical signal] [N1202]
- H04B10/672 . . . . . [N: for controlling the power of the input optical signal] [N1202]
- H04B10/673 . . . . . [N: using an optical preamplifier] [N1202]
- H04B10/674 . . . . . [N: using a variable optical attenuator] [N1202]
- H04B10/675 . . . . . [N: for controlling the optical bandwidth of the input signal, e.g. spectral filtering] [N1202]
- H04B10/676 . . . . . [N: for all-optical demodulation of the input optical signal] [N1202]
- H04B10/677 . . . . . [N: for differentially modulated signal, e.g. DPSK signals] [N1202]
- H04B10/69 . . . Electrical arrangements in the receiver [N1202]
- H04B10/691 . . . . [N: Arrangements for optimizing the photodetector in the receiver] [N1202]
- H04B10/6911 . . . . . [N: Photodiode bias control, e.g. for compensating temperature variations] [N1202]
- H04B10/693 . . . . . [N: Arrangements for optimizing the preamplifier in the receiver] [N1202]
- H04B10/6931 . . . . . [N: Automatic gain control of the preamplifier] [N1202]
- H04B10/6932 . . . . . [N: Bandwidth control of bit rate adaptation] [N1202]
- H04B10/6933 . . . . . [N: Offset control of the differential preamplifier] [N1202]
- H04B10/695 . . . . [N: Arrangements for optimizing the decision element in the receiver, e.g. by using automatic threshold control] [N1202]
- H04B10/697 . . . . [N: Arrangements for reducing noise and distortion] [N1202]
- H04B10/6971 . . . . . [N: using equalisation] [N1202]
- H04B10/6972 . . . . . [N: using passive filtering] [N1202]
- H04B10/6973 . . . . . [N: using noise matching networks] [N1202]
- H04B10/70 . Photonic quantum communication [N1202]
- [N: **WARNING**N1202]  
This group is not complete pending reclassification; see also [H04B10/30](#) ]
- H04B10/80 . 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 [N1202]
- H04B10/801 . . [N: using optical interconnects, e.g. light coupled isolators, circuit board interconnections] [N1202]
- H04B10/802 . . . [N: for isolation, e.g. using optocouplers] [N1202]
- H04B10/803 . . . [N: Free space interconnects, e.g. between circuit boards or chips] [N1202]
- H04B10/806 . . [N: Arrangements for feeding power] [N1202]

- H04B10/807 . . . [N: Optical power feeding, i.e. transmitting power using an optical signal] [N1202]
  - H04B10/808 . . . [N: Electrical power feeding of an optical transmission system (power feeding arrangements in general [H04B3/44](#) )] [N1202]
  - H04B10/85 . . Protection from unauthorised access, e.g. eavesdrop protection [N1202] [C1203]
  - H04B10/90 . Non-optical transmission systems, e.g. transmission systems employing non-photonics corpuscular radiation [N1202]
- [N: **WARNING**[N1202]  
This group is not complete pending reclassification; see also [H04B10/30](#) ]

#### **H04B11/00** Transmission systems employing sonic, ultrasonic or infrasonic waves

#### **H04B13/00** Transmission systems characterised by the medium used for transmission, not provided for in groups [H04B3/00](#) to [H04B11/00](#)

- H04B13/00B . [N: Transmission systems in which the medium consists of the human body ] [N0409]
- H04B13/02 . 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 [H04B3/00](#); [N: geophysics, detecting hidden masses G01H, [G01V1/16](#), [G01V1/18](#), [G01V3/00](#); sonars [G01S1/72](#); applications of earth currents [G01S1/72](#), [H05F7/00](#); direction and distance determination with lead cables [G01S13/00](#)])

#### **H04B14/00** Transmission systems not characterised by the medium used for transmission (details thereof [H04B1/00](#))

- H04B14/00B . [N: characterised by the use of a carrier modulation (using subcarrier modulation [H04B14/08](#))]
- H04B14/00B1 . . [N: Amplitude modulation]
- H04B14/00B2 . . [N: Angle modulation]
- H04B14/00B3 . . [N: Polarisation modulation]
- H04B14/02 . characterised by the use of pulse modulation (in radio transmission relays [H04B7/17](#); transmission of digital information per se [H04L](#))
- H04B14/02A . . [N: using pulse amplitude modulation]
- H04B14/02B . . [N: using pulse time characteristics modulation, e.g. width, position, interval]
- H04B14/04 . . using pulse code modulation (analogue/digital or digital/analogue conversion per se [H03M1/00](#); [N: for TV signals [H04N7/24](#)]) [C9412]
- H04B14/04B . . . [N: Special circuits, e.g. comparators]
- H04B14/04C . . . [N: Sample and hold circuits (in general [G11C27/02](#))]
- H04B14/04D . . . [N: Systems or methods for reducing noise or bandwidth]
- H04B14/04D2 . . . . [N: Non linear compression or expansion]
- H04B14/06 . . Using differential modulation, e.g. delta modulation (conversion of analogue values to or from differential modulation [H03M3/00](#)) [C9412]
- H04B14/06B . . . [N: using delta modulation or one-bit differential modulation [1DPCM] ]

- H04B14/06B2 . . . . [N: with adaptive feedback]
- H04B14/06C . . . . [N: using differential modulation with several bits (NDPCM)]
- H04B14/06C2 . . . . [N: with adaptive feedback]
  
- H04B14/08 . characterised by the use of a sub-carrier
  
- H04B15/00** **Suppression or limitation of noise or interference (by means associated with receiver [H04B1/10](#))**
  
- H04B15/00B . [N: Reducing noise e.g. humm, from the supply]
  
- H04B15/02 . Reducing interference from electric apparatus by means located at or near the interfering apparatus ([structural association with dynamo-electric machines H02K11/00](#))
  
- H04B15/02B . . [N: Reducing interference from ignition apparatus of fuel engines ([cables with high resistance H01B](#))]
  
- H04B15/04 . . the interference being caused by substantially sinusoidal oscillations, e.g. in a receiver, in a tape-recorder ([reducing parasitic oscillations H03B, H03F; screening H05K9/00](#))
  
- H04B15/06 . . . by local oscillators of receivers
  
- H04B17/00** **Monitoring; Testing [C0606]**
  
- H04B17/00A . [N: of transmitters ([H04B17/00D](#) takes precedence)]
- H04B17/00A1 . . [N: for calibration] [N1107]
- H04B17/00A1A . . . [N: of transmit antennas, e.g. of the amplitude or phase] [N1107]
- H04B17/00A1G . . . [N: of power amplifier, e.g. gain or non-linearities] [N1107]
- H04B17/00A1T . . . [N: of the whole transmission and reception path, e.g. self-test loop-back] [N1107]
- H04B17/00A1W . . . [N: of other elements, e.g. filter calibration or I/Q mismatch] [N1107]
- H04B17/00A2 . . [N: for performance testing] [N1107]
- H04B17/00A2E . . . [N: Test equipment at the transmitter] [N1107]
- H04B17/00A2F . . . [N: Detection of faulty performance, e.g. under performance or response deviations] [N1107]
- H04B17/00A2N . . . [N: Monitoring during normal operation] [N1107]
- H04B17/00A2S . . . [N: Self-testing arrangements] [N1107]
- H04B17/00A3 . . [N: for measurement of parameters] [N1107]
- H04B17/00A3P . . . [N: of radiated power at antenna port] [N1107]
- H04B17/00A3R . . . [N: of reflected power, e.g. return loss] [N1107]
- H04B17/00A3S . . . [N: of other parameters, e.g. DC offset, delay or propagation times] [N1107]
  
- H04B17/00B . [N: of receivers ([H04B17/00D](#), [H04B17/00F](#) take precedence)]
- H04B17/00B1 . . [N: Measuring channel quality parameters] [C0606]
- H04B17/00B1C . . . [N: Signal code power and other power values per channel] [N0606]
- H04B17/00B1D . . . [N: Delay profiles] [N0606]
- H04B17/00B1F . . . [N: Interference values] [N0606]

- H04B17/00B1L . . . [N: Adjacent channel leakage power] [N0606]
- H04B17/00B1N . . . [N: Noise values] [N1107]
- H04B17/00B1R . . . [N: Received signal strength] [N0606]
- H04B17/00B1S . . . [N: Estimation of signal-to-interference ratio [SIR] or carrier-to-interference ratio [CIR] ] [N0606] [C1107]
- H04B17/00B2 . . [N: Calibrating or correcting measurements] [N0606]
- H04B17/00B3 . . [N: Indication means, e.g. displays, alarms, audible means] [N0606]
- H04B17/00B4 . . [N: with feedback of measurements to the transmitter (for modifying transmission characteristics H04L1/00A9B, for allocation of payload in multicarrier systems H04L27/26M1P)] [N0606]
- H04B17/00B5 . . [N: using historical readings, averaging values or statistics] [N0606]
- H04B17/00B6 . . [N: for locating or positioning the transmitter] [N0606]
- H04B17/00B7 . . [N: Predicting channel quality parameters] [N0606]
- H04B17/00B8 . . [N:for resource allocation, admission control or handover] [N0606]
- H04B17/00B9 . . [N: for testing the receiver RF performance] [N1107]
- H04B17/00D . [N: using a service channel or an auxiliary channel]
- H04B17/00D1 . . [N: using test signal generators] [N0606]
- H04B17/00D2 . . [N: using auxiliary channels or channel simulators] [N0606]
- H04B17/00F . [N: Modeling or characterizing the propagation channel] [C0606]
- H04B17/00F1 . . [N: Fading models and fading generators] [C0606]
- H04B17/00F2 . . [N: Simulation models] [C0606]
- H04B17/00F3 . . [N: Predictive models] [C0606]
- H04B17/02 . of relay systems
- H04B17/02B . . [N: with selective localization]
- H04B17/02B1 . . . [N: using different frequencies]
- H04B17/02B1B . . . . [N: generated by local oscillators]
- H04B17/02B1C . . . . [N: selected by local filters]
- H04B17/02B1D . . . . [N: generated by local multipliers, dividers, modulators]
- H04B17/02B2 . . . [N: using coded addresses]
- H04B17/02C . . [N: without selective localization]
- H04B17/02C1 . . . [N: using successive loop-backs]
- H04B17/02C2 . . . [N: by means of resistance, voltage or current measurement]