

SECTION H — ELECTRICITY

H04 ELECTRIC COMMUNICATION TECHNIQUE

H04B TRANSMISSION [4]

Note(s)

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.

Subclass index

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SYSTEMS CHARACTERISED BY THE MEDIUM USED FOR TRANSMISSION	
Using conductors.....	3/00
Using free-space propagation.....	5/00-11/00
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SUPPRESSION OR LIMITATION OF NOISE OR INTERFERENCE.....	15/00
MONITORING, TESTING.....	17/00

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| <p>1/00 Details of transmission systems, not covered by a single one of groups H04B 3/00-H04B 13/00; Details of transmission systems not characterised by the medium used for transmission [1, 4, 2006.01]</p> <p>1/02 • Transmitters [1, 2006.01]</p> <p>1/03 • • Constructional details, e.g. casings, housings [2, 2006.01]</p> <p>1/034 • • • Portable transmitters [2, 2006.01]</p> <p>1/036 • • • Cooling arrangements [2, 2006.01]</p> <p>1/04 • • Circuits [1, 2006.01]</p> <p>1/06 • Receivers [1, 2006.01]</p> <p>1/08 • • Constructional details, e.g. cabinet [1, 2006.01]</p> <p>1/10 • • Means associated with receiver for limiting or suppressing noise or interference [1, 2006.01]</p> <p>1/12 • • • Neutralising, balancing, or compensation arrangements [1, 2006.01]</p> <p>1/14 • • • Automatic detuning arrangements [1, 2006.01]</p> <p>1/16 • • Circuits [1, 2006.01]</p> <p>1/18 • • • Input circuits, e.g. for coupling to an aerial or a transmission line (coupling networks between aerials or lines and receivers independent of the nature of the receiver H03H) [1, 2006.01]</p> <p>1/20 • • • for coupling gramophone pick-up, recorder output, or microphone to receiver [1, 2006.01]</p> <p>1/22 • • • for receivers in which no local oscillation is generated [1, 2006.01]</p> <p>1/24 • • • • the receiver comprising at least one semiconductor device having three or more electrodes [1, 2006.01]</p> <p>1/26 • • • for superheterodyne receivers (multiple frequency-changing H03D 7/16) [1, 2006.01]</p> <p>1/28 • • • • the receiver comprising at least one semiconductor device having three or more electrodes [1, 2006.01]</p> <p>1/30 • • • for homodyne or synchrodyne receivers (demodulator circuits H03D 1/22) [1, 2006.01]</p> | <p>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, 2006.01, 2015.01]</p> <p>1/3805 • • with built-in auxiliary receivers [2015.01]</p> <p>1/3816 • • Mechanical arrangements for accommodating identification devices, e.g. cards or chips; with connectors for programming identification devices [2015.01]</p> <p>1/3818 • • • Arrangements for facilitating insertion or removal of identification devices [2015.01]</p> <p>1/3822 • • specially adapted for use in vehicles (H04B 1/3827 takes precedence) [2015.01]</p> <p>1/3827 • • Portable transceivers [2015.01]</p> <p>1/3877 • • • Arrangements for enabling portable transceivers to be used in a fixed position, e.g. cradles or boosters [2015.01]</p> <p>1/3883 • • • Arrangements for mounting batteries or battery chargers [2015.01]</p> <p>1/3888 • • • Arrangements for carrying or protecting transceivers [2015.01]</p> <p>1/40 • • Circuits [1, 2006.01, 2015.01]</p> <p>1/401 • • • for selecting or indicating operating mode [2015.01]</p> <p>1/403 • • • using the same oscillator for generating both the transmitter frequency and the receiver local oscillator frequency [2015.01]</p> <p>1/405 • • • • with multiple discrete channels [2015.01]</p> <p>1/408 • • • • the transmitter oscillator frequency being identical to the receiver local oscillator frequency [2015.01]</p> <p>1/44 • • • Transmit/receive switching [1, 2, 2006.01]</p> <p>1/46 • • • • by voice-frequency signals; by pilot signals [1, 2006.01]</p> |
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- 1/48 • • • • in circuits for connecting transmitter and receiver to a common transmission path, e.g. by energy of transmitter **[1, 2006.01]**
- 1/50 • • • using different frequencies for the two directions of communication **[1, 2006.01]**
- 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, 2006.01, 2015.01]**
- 1/525 • • • • • with means for reducing leakage of transmitter signal into the receiver **[2015.01]**
- 1/54 • • • using the same frequency for two directions of communication (H04B 1/44 takes precedence) **[1, 2006.01]**
- 1/56 • • • • with provision for simultaneous communication in two directions **[1, 2006.01]**
- 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, 2006.01]**
- 1/59 • Responders; Transponders **[1, 2006.01]**
- 1/60 • Supervising unattended repeaters **[1, 2006.01]**
- 1/62 • for providing a predistortion of the signal in the transmitter and corresponding correction in the receiver, e.g. for improving the signal/noise ratio **[1, 2006.01]**
- 1/64 • • Volume compression or expansion arrangements **[1, 2006.01]**
- 1/66 • for reducing bandwidth of signals; for improving efficiency of transmission (H04B 1/68 takes precedence) **[1, 2006.01]**
- 1/68 • for wholly or partially suppressing the carrier or one side band **[1, 4, 2006.01]**
- 1/69 • Spread spectrum techniques **[6, 2006.01, 2011.01]**

Note(s) [2011.01]

When classifying in this group, any aspect of code division multiplexing, which is considered to represent information of interest for search, may also be classified in group H04J 13/00.

- 1/692 • • Hybrid techniques using combinations of two or more spread spectrum techniques **[2011.01]**
- 1/707 • • using direct sequence modulation **[6, 2006.01, 2011.01]**
- 1/7073 • • • Synchronisation aspects **[2011.01]**
- 1/7075 • • • • with code phase acquisition **[2011.01]**
- 1/7077 • • • • • Multi-step acquisition, e.g. multi-dwell, coarse-fine or validation **[2011.01]**
- 1/708 • • • • • Parallel implementation **[2011.01]**
- 1/7083 • • • • • Cell search, e.g. using a three-step approach **[2011.01]**
- 1/7085 • • • • • using a code tracking loop, e.g. a delay-locked loop **[2011.01]**
- 1/7087 • • • • • Carrier synchronisation aspects **[2011.01]**
- 1/709 • • • Correlator structure **[2011.01]**
- 1/7093 • • • • Matched filter type **[2011.01]**
- 1/7095 • • • • Sliding correlator type **[2011.01]**
- 1/7097 • • • Interference-related aspects **[2011.01]**
- 1/71 • • • • the interference being narrowband interference **[2011.01]**
- 1/7103 • • • • the interference being multiple access interference **[2011.01]**

- 1/7105 • • • • • Joint detection techniques, e.g. linear detectors **[2011.01]**
- 1/7107 • • • • • Subtractive interference cancellation **[2011.01]**
- 1/711 • • • • the interference being multi-path interference **[2011.01]**
- 1/7113 • • • • • Determination of path profile **[2011.01]**
- 1/7115 • • • • • Constructive combining of multi-path signals, i.e. RAKE receivers **[2011.01]**
- 1/7117 • • • • • • Selection, re-selection, allocation or re-allocation of paths to fingers, e.g. timing offset control of allocated fingers **[2011.01]**
- 1/712 • • • • • • Weighting of fingers for combining, e.g. amplitude control or phase rotation using an inner loop **[2011.01]**
- 1/713 • • using frequency hopping **[6, 2006.01, 2011.01]**
- 1/7136 • • • Arrangements for generation of hop frequencies, e.g. using a bank of frequency sources, using continuous tuning or using a transform **[2011.01]**
- 1/7143 • • • Arrangements for generation of hop patterns **[2011.01]**
- 1/715 • • • Interference-related aspects **[2011.01]**
- 1/7156 • • • Arrangements for sequence synchronisation **[2011.01]**
- 1/7163 • • using impulse radio **[2011.01]**
- 1/717 • • • Pulse-related aspects **[2011.01]**
- 1/7176 • • • Data mapping, e.g. modulation **[2011.01]**
- 1/7183 • • • Synchronisation **[2011.01]**
- 1/719 • • • Interference-related aspects **[2011.01]**
- 1/72 • Circuits or components for simulating aerials, e.g. dummy aerials **[1, 2006.01]**
- 1/74 • for increasing reliability, e.g. using redundant or spare channels or apparatus **[3, 2006.01]**
- 1/76 • Pilot transmitters or receivers for control of transmission or for equalising **[3, 2006.01]**

3/00 Line transmission systems (combined with near-field transmission systems H04B 5/00) **[1, 2006.01]**

- 3/02 • Details **[1, 2006.01]**
- 3/03 • • Hybrid circuits (for transceivers H04B 1/52, H04B 1/58) **[3, 2006.01]**
- 3/04 • • Control of transmission; Equalising **[1, 2006.01]**
- 3/06 • • • by the transmitted signal **[1, 2006.01]**
- 3/08 • • • • in negative-feedback path of line amplifier **[1, 2006.01]**
- 3/10 • • • by pilot signal **[1, 2006.01]**
- 3/11 • • • • using pilot wire (H04B 3/12 take precedence) **[3, 2006.01]**
- 3/12 • • • • • in negative-feedback path of line amplifier **[1, 2006.01]**
- 3/14 • • • characterised by the equalising network used **[1, 2006.01]**
- 3/16 • • • characterised by the negative-impedance network used **[1, 2006.01]**
- 3/18 • • • • wherein the network comprises semiconductor devices **[1, 2006.01]**
- 3/20 • • Reducing echo effects or singing; Opening or closing transmitting path; Conditioning for transmission in one direction or the other **[1, 2006.01]**
- 3/21 • • • using a set of bandfilters **[3, 2006.01]**
- 3/23 • • • using a replica of transmitted signal in the time domain, e.g. echo cancellers **[3, 2006.01]**

- 3/26 • • Improving frequency characteristic by the use of loading coils [1, 2006.01]
- 3/28 • • Reducing interference caused by currents induced in cable sheathing or armouring [1, 2006.01]
- 3/30 • • Reducing interference caused by unbalance current in a normally balanced line [1, 2006.01]
- 3/32 • • Reducing cross-talk, e.g. by compensating [1, 2006.01]
- 3/34 • • • by systematic interconnection of lengths of cable during laying; by addition of balancing components to cable during laying [1, 2006.01]
- 3/36 • • Repeater circuits (H04B 3/58 takes precedence) [1, 2006.01]
- 3/38 • • • for signals in two different frequency ranges transmitted in opposite directions over the same transmission path [1, 2006.01]
- 3/40 • • Artificial lines; Networks simulating a line of certain length [1, 2006.01]
- 3/42 • • Circuits for by-passing of ringing signals [1, 2006.01]
- 3/44 • • Arrangements for feeding power to a repeater along the transmission line [1, 2006.01]
- 3/46 • • Monitoring; Testing [1, 2006.01, 2015.01]
- 3/462 • • • Testing group delay or phase shift, e.g. timing jitter [2015.01]
- 3/466 • • • • Testing attenuation in combination with at least one of group delay and phase shift [2015.01]
- 3/48 • • • Testing attenuation (H04B 3/466 takes precedence) [1, 2006.01, 2015.01]
- 3/487 • • • Testing crosstalk effects [2015.01]
- 3/493 • • • Testing echo effects or ringing [2015.01]
- 3/50 • Systems for transmission between fixed stations *via* two-conductor transmission lines (H04B 3/54 takes precedence) [1, 2006.01]
- 3/52 • Systems for transmission between fixed stations *via* waveguides [1, 2006.01]
- 3/54 • Systems for transmission *via* power distribution lines (in alarm signalling systems G08B 25/06) [1, 2006.01]
- 3/56 • • Circuits for coupling, blocking, or by-passing of signals [1, 2006.01]
- 3/58 • • Repeater circuits [1, 2006.01]
- 3/60 • Systems for communication between relatively movable stations, e.g. for communication with lift (H04B 3/54 takes precedence) [1, 2006.01]

- 5/00 **Near-field transmission systems, e.g. inductive loop type** [1, 2006.01]
- 5/02 • using transceiver [1, 2006.01]
- 5/04 • Calling systems, e.g. paging system [1, 2006.01]
- 5/06 • using a portable transmitter associated with a microphone [1, 2006.01]

- 7/00 **Radio transmission systems, i.e. using radiation field** (H04B 10/00, H04B 15/00 take precedence) [1, 2006.01]
- 7/005 • Control of transmission; Equalising [3, 2006.01]
- 7/01 • Reducing phase shift [3, 2006.01]
- 7/015 • Reducing echo effects [3, 2006.01]
- 7/02 • Diversity systems; Multi-antenna systems, i.e. transmission or reception using multiple antennas [1, 2006.01, 2017.01]
- 7/022 • • Site diversity; Macro-diversity (using two or more spaced independent antennas H04B 7/04) [2017.01]

- 7/024 • • • Co-operative use of antennas at several sites, e.g. in co-ordinated multipoint or co-operative multiple-input multiple-output [MIMO] systems [2017.01]
- 7/026 • • • Co-operative diversity, e.g. using fixed or mobile stations as relays [2017.01]
- 7/04 • • using two or more spaced independent antennas [1, 2006.01, 2017.01]
- 7/0404 • • • the mobile station comprising multiple antennas, e.g. to provide uplink diversity [2017.01]
- 7/0408 • • • using two or more beams, i.e. beam diversity [2017.01]
- 7/0413 • • • MIMO systems [2017.01]
- 7/0417 • • • • Feedback systems [2017.01]
- 7/0426 • • • • Power distribution [2017.01]
- 7/0452 • • • • Multi-user MIMO systems [2017.01]
- 7/0456 • • • • Selection of precoding matrices or codebooks, e.g. using matrices for antenna weighting [2017.01]
- 7/0491 • • • using two or more sectors, i.e. sector diversity [2017.01]
- 7/0495 • • • • using overlapping sectors in the same base station to implement MIMO antennas [2017.01]
- 7/06 • • • at the transmitting station [1, 2006.01]
- 7/08 • • • at the receiving station [1, 2006.01]
- 7/10 • • Polarisation diversity; Directional diversity [1, 2006.01]
- 7/12 • • Frequency diversity [1, 2006.01]
- 7/14 • Relay systems [1, 2, 2006.01]
- 7/145 • • Passive relay systems [2, 2006.01]
- 7/15 • • Active relay systems [2, 2006.01]
- 7/155 • • • Ground-based stations (H04B 7/204 takes precedence) [2, 5, 2006.01]
- 7/165 • • • • employing angle modulation [2, 2006.01]
- 7/17 • • • • employing pulse modulation, e.g. pulse code modulation [2, 2006.01]
- 7/185 • • • Space-based or airborne stations (H04B 7/204 takes precedence) [2, 5, 2006.01]
- 7/19 • • • • Earth-synchronous stations [2, 2006.01]
- 7/195 • • • • Non-synchronous stations [2, 2006.01]
- 7/204 • • • Multiple access [5, 2006.01]
- 7/208 • • • • Frequency-division multiple access [5, 2006.01]
- 7/212 • • • • Time-division multiple access [5, 2006.01]
- 7/216 • • • • Code-division or spread-spectrum multiple access [5, 2006.01]
- 7/22 • Scatter propagation systems [1, 2006.01]
- 7/24 • for communication between two or more posts (wireless communication networks H04W) [2, 2006.01]
- 7/26 • • at least one of which is mobile [2, 2006.01]

- 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** [5, 2006.01, 2013.01]
- Note(s) [2013.01]**
In this group, non-optical transmission systems are classified in group H04B 10/90.
- 10/03 • Arrangements for fault recovery [2013.01]
- 10/032 • • using working and protection systems [2013.01]
- 10/035 • • using loopbacks [2013.01]

- 10/038 • • using bypasses [2013.01]
- 10/07 • Arrangements for monitoring or testing transmission systems; Arrangements for fault measurement of transmission systems [2013.01]
- 10/071 • • using a reflected signal, e.g. using optical time-domain reflectometers [OTDRs] [2013.01]
- 10/073 • • using an out-of-service signal (H04B 10/071 takes precedence) [2013.01]
- 10/075 • • using an in-service signal (H04B 10/071 takes precedence) [2013.01]
- 10/077 • • • using a supervisory or additional signal [2013.01]
- 10/079 • • • using measurements of the data signal [2013.01]
- 10/11 • Arrangements specific to free-space transmission, i.e. transmission through air or vacuum [2013.01]
- 10/112 • • Line-of-sight transmission over an extended range [2013.01]
- 10/114 • • Indoor or close-range type systems [2013.01]
- 10/116 • • • Visible light communication [2013.01]
- 10/118 • • specially adapted for satellite communication [2013.01]
- 10/25 • Arrangements specific to fibre transmission [2013.01]
- 10/2507 • • for the reduction or elimination of distortion or dispersion [2013.01]
- 10/2513 • • • due to chromatic dispersion [2013.01]
- 10/2519 • • • • using Bragg gratings [2013.01]
- 10/2525 • • • • using dispersion-compensating fibres [2013.01]
- 10/2531 • • • • using spectral inversion [2013.01]
- 10/2537 • • • due to scattering processes, e.g. Raman or Brillouin scattering [2013.01]
- 10/2543 • • • due to fibre non-linearities, e.g. Kerr effect [2013.01]
- 10/255 • • • • Self-phase modulation [SPM] [2013.01]
- 10/2557 • • • • Cross-phase modulation [XPM] [2013.01]
- 10/2563 • • • • Four-wave mixing [FWM] [2013.01]
- 10/2569 • • • due to polarisation mode dispersion [PMD] [2013.01]
- 10/2575 • • Radio-over-fibre, e.g. radio frequency signal modulated onto an optical carrier [2013.01]
- 10/2581 • • Multimode transmission [2013.01]
- 10/2587 • • using a single light source for multiple stations [2013.01]
- 10/27 • Arrangements for networking [2013.01]
- 10/272 • • Star-type networks [2013.01]
- 10/275 • • Ring-type networks [2013.01]
- 10/278 • • Bus-type networks [2013.01]
- 10/29 • Repeaters [2013.01]
- 10/291 • • in which processing or amplification is carried out without conversion of the main signal from optical form [2013.01]
- 10/293 • • • Signal power control [2013.01]
- 10/294 • • • • in a multiwavelength system, e.g. gain equalisation [2013.01]
- 10/296 • • • • • Transient power control, e.g. due to channel add/drop or rapid fluctuations in the input power [2013.01]
- 10/297 • • • Bidirectional amplification [2013.01]
- 10/299 • • • Signal waveform processing, e.g. reshaping or retiming [2013.01]
- 10/40 • Transceivers [2013.01]
- 10/43 • • using a single component as both light source and receiver, e.g. using a photoemitter as a photoreceiver [2013.01]
- 10/50 • Transmitters [2013.01]
- 10/508 • • Pulse generation, e.g. generation of solitons [2013.01]
- 10/516 • • Details of coding or modulation [2013.01]
- 10/524 • • • Pulse modulation [2013.01]
- 10/532 • • • Polarisation modulation [2013.01]
- 10/54 • • • Intensity modulation [2013.01]
- 10/548 • • • Phase or frequency modulation [2013.01]
- 10/556 • • • • Digital modulation, e.g. differential phase shift keying [DPSK] or frequency shift keying [FSK] [2013.01]
- 10/564 • • Power control [2013.01]
- 10/572 • • Wavelength control [2013.01]
- 10/58 • • Compensation for non-linear transmitter output [2013.01]
- 10/588 • • • in external modulation systems [2013.01]
- 10/60 • Receivers [2013.01]
- 10/61 • • Coherent receivers [2013.01]
- 10/63 • • • Homodyne [2013.01]
- 10/64 • • • Heterodyne [2013.01]
- 10/66 • • Non-coherent receivers, e.g. using direct detection [2013.01]
- 10/67 • • • Optical arrangements in the receiver [2013.01]
- 10/69 • • • Electrical arrangements in the receiver [2013.01]
- 10/70 • Photonic quantum communication [2013.01]
- 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 [2013.01]
- 10/85 • • Protection from unauthorised access, e.g. eavesdrop protection [2013.01]
- 10/90 • Non-optical transmission systems, e.g. transmission systems employing non-photonic corpuscular radiation [2013.01]
- 11/00 Transmission systems employing ultrasonic, sonic or infrasonic waves [1, 2006.01]**
- 13/00 Transmission systems characterised by the medium used for transmission, not provided for in groups H04B 3/00-H04B 11/00 [1, 2006.01]**
- 13/02 • Transmission systems in which the medium consists of the earth or a large mass of water thereon, e.g. earth telegraphy [1, 2006.01]
- 14/00 Transmission systems not characterised by the medium used for transmission (details thereof H04B 1/00) [4, 2006.01]**
- 14/02 • characterised by the use of pulse modulation (in radio transmission relays H04B 7/17) [4, 2006.01]
- 14/04 • • using pulse code modulation [4, 2006.01]
- 14/06 • • using differential modulation, e.g. delta modulation [4, 2006.01]
- 14/08 • characterised by the use of a sub-carrier [4, 2006.01]
- 15/00 Suppression or limitation of noise or interference (by means associated with receiver H04B 1/10) [1, 2006.01]**
- 15/02 • Reducing interference from electric apparatus by means located at or near the interfering apparatus [1, 2006.01]
- 15/04 • • the interference being caused by substantially sinusoidal oscillations, e.g. in a receiver or in a tape-recorder [1, 2006.01]
- 15/06 • • • by local oscillators of receivers [1, 2006.01]

- 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) [**2, 2006.01, 2015.01**]
- 17/10 • of transmitters [**2015.01**]
 - 17/11 • • for calibration [**2015.01**]
 - 17/12 • • • of transmit antennas, e.g. of amplitude or phase [**2015.01**]
 - 17/13 • • • of power amplifiers, e.g. of gain or non-linearity [**2015.01**]
 - 17/14 • • • of the whole transmission and reception path, e.g. self-test loop-back [**2015.01**]
 - 17/15 • • Performance testing [**2015.01**]
 - 17/16 • • • Test equipment located at the transmitter [**2015.01**]
 - 17/17 • • • Detection of non-compliance or faulty performance, e.g. response deviations (H04B 17/18 takes precedence) [**2015.01**]
 - 17/18 • • • Monitoring during normal operation [**2015.01**]
 - 17/19 • • • Self-testing arrangements [**2015.01**]
 - 17/20 • of receivers [**2015.01**]
 - 17/21 • • for calibration; for correcting measurements [**2015.01**]
 - 17/23 • • Indication means, e.g. displays, alarms or audible means [**2015.01**]
 - 17/24 • • with feedback of measurements to the transmitter [**2015.01**]
 - 17/26 • • using historical data, averaging values or statistics [**2015.01**]
 - 17/27 • • for locating or positioning the transmitter [**2015.01**]
 - 17/29 • • Performance testing [**2015.01**]
 - 17/30 • of propagation channels [**2015.01**]
 - 17/309 • • Measuring or estimating channel quality parameters [**2015.01**]
 - 17/318 • • • Received signal strength [**2015.01**]
 - 17/327 • • • Received signal code power [RSCP] [**2015.01**]
 - 17/336 • • • Signal-to-interference ratio [SIR] or carrier-to-interference ratio [CIR] [**2015.01**]
 - 17/345 • • • Interference values (H04B 17/336 takes precedence) [**2015.01**]
 - 17/354 • • • Adjacent channel leakage power [**2015.01**]
 - 17/364 • • • Delay profiles [**2015.01**]
 - 17/373 • • Predicting channel quality parameters [**2015.01**]
 - 17/382 • • for resource allocation, admission control or handover [**2015.01**]
 - 17/391 • • Modelling the propagation channel [**2015.01**]
 - 17/40 • of relay systems [**2015.01**]