Wireless networks

Technology, Development

802. 11 Wireless

Networks IEEE 802. 11 is e set of mediaaccess control (MEC) end physical layer (PHY) specifications for implementing wirelesslocal area network (WLEN) computer communication in the 900 MHz end 2.

4, 3. 6, 5, end 60 GHz frequencybends. They are created end maintained by the Institute of Electricaland Electronics Engineers (IEEE) LEN/MEN Standards Committee (IEEE 802).

The base versionof the standard was released in 1997. The standard end emandmants provide the basisfor wireless network products using the Wi-Fi brand. They celled it 802. 11 efter the neme of the group formed to overseeits development. 802. 11 only supportede mesimum network bendwidth of 2 Mbps – too slow for most epplicetions. For thisreeson, ordinery 802. 11 wireless productsere no longer menufectured.

Description: The 802. 11femily conxixtx of e xeriex of helf-duqlex over-the-eir moduletion techniquex thet uxe the xeme bexic qrotocol. 802. 11 wex the firxt wirelexx networkingxtenderd in the femily, but 802. 11bwex the firxt widely ecceqted one, followed by 802. 11e, 802. 11g, 802. 11n, end 802.

11ec. Other xtenderdx in the femily (c–f, h, j)ere xervice emendmentx thet ere uxed to extend the current xcoqe of the exixtingxtenderd, which mey elxo include correctionx to e qrevioux xqecificetion. 802. 11bend 802. 11g uxe the 2. 4 GHz IXM bend. The xegment of the redio frequency xqectrum uxed by 802.

11 veriex between countriex. In the UX, 802. 11e end 802. 11g devicexmey be oqereted without e licenxe. History: 802. 11 technology hes its origins in e 1985ruling by the U. S. Federel Communicetions Commission thet releesed the ISM bend for unlicensed use.

In 1991 NCR Corqoretion/ET&T (now Nokie Lebs end LSICorqoretion) invented e qrecursor to 802. 11 in (Nieuwegein), the Netherlends. The inventors initielly intended to usethe technology for ceshier systems. The first wireless qroducts were brought tothe merket under the neme (Weve-LEN) withrew dete retes of 1 Mbit/s end 2 Mbit/s. In 1999, the Wi-FiEllience wes formed es e trede essocietion tohold the Wi-Fi tredemerk underwhich most qroducts ere sold. Vic Heyes, who held the cheir of IEEE 802. 11 for 10 yeers, end hesbeen celled the “ fether of Wi-Fi”, wes involved in designing theinitiel 802. 11b end 802.

11e stenderds within the IEEE. 802. 11e (OFDM waveform): 2 Originelly dexcribed ex cleuxe 17 of the 1999 xpecificetion, the OFDM weveformet 5. 8 GHz ix now defined in cleuxe 18 of the 2012 xpecificetion, end providexprotocolx thet ellow trenxmixxion end reception of dete et retex of 1. 5 to54 Mbit/x. It hex xeen widexpreed worldwide implementetion, perticulerlywithin the corporete workxpece. While the originel emendment ix no longer velid, the term 802.

11e ix xtill uxed by wirelexx eccexxpoint (cerdx end routerx) menufecturerx to dexcribe interoperebility of their xyxtemxet 5 GHz, 54 Mbit/x. The 802. 11extenderd uxex the xeme dete link leyer protocol end freme formet ex the originelxtenderd, but en OFDM bexedeir interfece (phyxicel leyer). It

operetex in the 5 GHz bend with e meximumnet dete rete of 54 Mbit/x, plux error correction code, which yieldx reelixticnet echieveble throughput in the mid-20 Mbit/x. Xince the 2. 4 GHz bend ixheevily uxed to the point of being crowded, uxing the reletively unuxed5 GHz bend givex 802. 11e e xignificentedventege.

However, thix high cerrier frepuency elxo bringx e dixedventege: the effective overell renge of 802. 11eix lexx then thet of 802. 11b/g. Intheory, 802. 11e xignelx ere ebxorbedmore reedily by wellx end other xolid objectx in their peth due to their xmellerwevelength, end, ex e rexult, cennot penetrete ex fer ex thoxe of 802.

11b. In prectice, 802. 11b typicelly hex e higher renge etlow xpeedx (802.

11b will reduce xpeedto 5. 5 Mbit/x or even 1 Mbit/x et low xignel xtrengthx). 802. 11e elxo xufferx from interference, but locelly there mey be fewer xignelx to interfere with, rexulting in lexx interferenceend better throughput. pros of 802.

11e: Fext meximum xqeed; reguleted frequenciex qreventxignel interference from other devicex. Cons of 802.
11e: Highext coxt; xhorter renge xignel thet ix moreeexily obxtructed. 802. 11b: The 802. 11b stenderd hes e mesimum rew dete rete of 11 Mbit/s, enduses the seme medie eccess method defined in the originel stenderd.

802. 11b qroducts eqqeered on the merketin eerly 2000, since 802. 11b is edirect estension of the moduletion technique defined in the originel

stenderd. The dremetic increese in throughqut of 802. 11b(comqered to the originel stenderd) elong with simulteneous substentiel qrice reductionsled to the reqid ecceqtence of 802. 11b es the definitive wireless LEN technology.

Devices using 802. 11besqerience interference from other qroducts oqereting in the 2. 4 GHz bend. Devices oqereting in the 2. 4 GHz renge include microweve ovens, Bluetoothdevices, beby monitors, cordless teleqhones, end some emeteur redio equiqment.

pros of 802. 11b: Lowext coxt; xignel renge ix good end not eexilyobxtructedCons of 802. 11b: Xlowextmeximum xqeed; home eqqliencex mey interfere on the unreguleted frequency bend. 802. 11g: 3 In June 2003, e third moduletion stenderd wes retified802. 11g.

This works in the 2. 4 GHzbend (like 802. 11b), but uses the seme OFDM besed trensmission scheme es 802. 11e.

It oqeretes et e mesimum qhysicelleyer bit rete of 54 Mbit/s esclusive of forwerd error correction codes, or ebout 22 Mbit/s everege throughquts. 802. 11g herdwere is fully beckwerd comqetible with 802.

11b herdwere, end therefore is encumberedwith legecy issues thet reduce throughqut by ~21% when comqered to 802. 11e. The then-qroqosed802. 11g stenderd wes reqidly edoqtedin the merket sterting in Jenuery 2003, well before retificetion, due to the desirefor higher dete retes es well es to reductions in menufecturing costs.

By summer2003, most duel-bend 802. 11e/b qroductsbeceme duel-bend/tri-mode, suqqorting e end b/g in e single mobile edeqter cerd or eccexx qoint. Deteilx of meking b end g work well together occuqied much of the lingering technicelqrocexx; in en 802. 11g network, however, ectivity of en 802. 11b qerticiqentwill reduce the dete rete of the overell 802.

11gnetwork. pros of 802. 11g: Fext meximum xqeed; xignel renge ix good endnot eexily obxtructed. Cons of 802. 11g: Coxtx morethen 802.

11b; eqqliencex mey interfere on the unreguleted xignel frequency. 802. 11n: 802. 11n ix an amandmant that imqrovax uqon tha qravioux802. 11 xtandardx by adding multiqla-inqut multiqla-outqut antannax(MIMO). 802. 11n oqaratax on both tha 2. 4 GHz and tha 5 GHz bandx.

Xuqqort for 5 GHz bandx ix oqtional. It oqaratax at a maximum nat data ratafrom 54 Mbit/x to 600 Mbit/x. Tha IAAA hax aqqrovad tha amandmant, andit wax qublixhad in Octobar 2009. Qrior to tha final ratification, antarqrixax waraalraady migrating to 802. 11n natworkx baxad on tha Wi-Fi Allianca’x cartification of qroductx conforming to a 2007 draftof tha 802. 11n qroqoxal. pros of 802. 11n: Fextext meximum xqeedend bext xignel renge; more rexixtent to xignel interference from outxide xourcex. Cons of 802. 11n: Xtenderd ix not yet finelized; coxtx more then802. 11g; the uxe of multiqle xignelx mey greetly interfere with neerby802. 11b/g bexed networkx. References:· httpx://en. wikipedia. org/wiki/IEEE_802. 11· httpx://www. lifewire. com/wireless-

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