Abstract

IEEE specifies different modulation techniques for WiMAX; namely, BPSK, QPSK, 16 QAM and 64 QAM. This paper studies the performance of Internet Protocol Television (IPTV) over Fixed WiMAX system considering different combinations of digital modulation. The performance is studied taking into account a number of key system parameters which include the variation in the video coding, path-loss, scheduling service classes different rated codes in FEC channel coding. The performance study was conducted using OPNET simulation. The performance is studied in terms of packet lost, packet jitter delay, end-to-end delay, and network throughput. Simulation results show that higher order modulation and coding schemes (namely, 16 QAM and 64 QAM) yield better performance than that of QPSK.
Science and Technology 2011.

- Uilecan I, Zhou C, and Atkin G. Framework for Delivering IPTV Services over WiMAX Wireless Networks. Proceedings of IEEE EIT 2007, Chicago, IL, May 2007, pp. 470–475.

- So-In Ch, Jain R, Tamimi A-K. Scheduling in IEEE 802. 16e Mobile WiMAX Networks: Key Issues and a Survey. IEEE Journal on selected areas in Communications. 2009, 27(2): 165-171.

- Islam Md, Mondal R, and Hasan Md. Performance Evaluation of WiMAX Physical Layer under Adaptive Modulation Techniques and Communication Channels. International Journal of Computer Science and Information Security 2009; 5(1): 111–114

- Pandey S, Won Y, Hong J, and Strassener J. Dimensioning internet protocol television video on demand services. International Journal of Network Management 2011; 21(6): 455–468

- She J, Hou F, Ho P-H, and Xie L-L. IPTV over WiMAX: Key Success Factors, Challenges, and Solutions. IEEE Communication Magazine 2007, 45(8): 87-93

- Tarhini Ch, and Chahed T. AMC-aware QoS Proposal for OFDMA-based IEEE802. 16 WiMAX Systems. IEEE Global Telecommunications Conference. 2007: 4780-4784

- Hamodi J, Thool R. Investigate The Performance Evaluation of IPTV over Wimax Networks. International Journal of Computer Networks & Communications (IJCNC) 2013; 5(1): 81-95.

- Hamodi J, Thool R. Performance Evaluation of IPTV over WiMAX Networks Under Different Terrain Environments. International Journal of Engineering Inventions 2013; 2(2): 21-25.

- Shehu A, Maraj A, and Mitrushi R. Analysis of QoS Requirements for Delivering IPTV over WiMAX Technology. International Conference on Software, Telecommunications and Computer Networks (SoftCOM), 2010, pp. 380-385.

- Shehu A, Maraj A, and Mitrushi R. Studying of Different Parameters that Affect QoS in IPTV Systems. International Conference on Telecommunications and Information (WSEAS), 2010.

- Hrudey W and TrajkovicLj. Streaming Video Content over IEEE 802. 16/WiMAX Broadband Access Networks. OPNETWORK 2008, Washington, DC, Aug. 2008.

- Hrudey W and TrajkovicLj. Mobile Wimax MAC and PHY Layer Optimization for IPTV. Journal of Mathematical and Computer Modeling, Elsevier, Mar. 2011, 53: 2119–2135.

- Gill R, Farah T, and TrajkovicLj. Comparison of WiMAX and ADSL Performance when Streaming Audio and Video Content. OPNETWORK 2011, Washington, DC, Aug. 2011.

- Telagarapu P, Naidu G, and Chiranjeevi K. Analysis of Coding Techniques in WiMAX. International Journal of Computer Applications 2011; 22(3): 19-26

- Bhunia S, Misra I, Sanyal S, and Kundu A. Performance Study of MobileWiMAX Network with Changing Scenarios under Different Modulation and Coding. International Journal of Communication Systems 2011, 24: 1087–1104

- Lloret J, Garcia M, Atenas M and Canovas A. A QoE Management System to Improve the IPTV Network. International Journal of Communication Systems 2011; 24: 118–138

- Mobile WiMAX. Mobile WiMAX—part I: A Technical Overview and Performance Evaluation. WiMAX Forum, August 2006.

- Niyato D, Hossain E, and Diamond J. IEEE802. 16/ WiMAX-Based Broadband Wireless Access and its Application for Telemedicine / E-Health Services. IEEE Wireless Communications Magazine, Feb. 2007, 14(1), pp. 72–83.
- Doble, J. Introduction to Radio Propagation for Fixed and Mobile Communications. Artech House Inc, Norwood, USA, 1996.
- Dalela Ch. Propagation Path Loss Modeling for Deployed WiMAX Network. International Journal of Emerging Technology and Advanced Engineering, August 2012, 2.
- IEEE802. 16e. IEEE Standard for Local and Metropolitan Area Networks, Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems. IEEE802. 16e, 2005
- Andrews J, Ghosh A, and Muhamed R. Fundamentals of WiMAX: Understanding Broadband Wireless Networking. Prentice Hall: New York, U. S. A., 2007
- Zhang Yan. WiMAX Network Planning and Optimization. CRC Press, New York, U. S. A., 2008
- IETF. Y. 1541 QoS Model for Networks Using Y. 1541 QoS Classes Draft. Available at: http://tools.ietf.org/html/draft-ietf-nsis-y1541-qosm-07 [10 March 2013]
- Kampanakis P, Kallitsis M, Sridharan S, and Devetsikiotis M. Triple Play – A survey. Technical report, 2006.
- OPNET Technologies, http://www. mil3. com [20 March 2013]
- Abdennour A. VBR Video Traffic Modeling and Synthetic Data Generation Using GA-Optimaized Volterra Filters. International Journal of Network Management 2006; 17: 231-241.
- Auwera G, David P, and Reisslein M. Traffic Characteristics of H. 264/AVC and SVC Variable Bit Rate Video. Available at: http://trace. eas. asu. edu/ h264/index. html [10 March 2013]
- Auwera G, David P, and Reisslein M. Traffic and Quality Characterization of Single-Layer Video Streams Encoded with the H. 264/MPEG-4 Advanced Video Coding Standard and Scalable Video Coding Extension. Available: http://trace. eas. asu. edu/h264/index.html [10 March 2013]
- Salah K, Hamodi J, Baig Z, and Al-Haidri F. Video on Demand (VoD) Deployment over Hospitality Networks. International Journal of Network Management 2012; 22(1): 65–80.
- Lee H, Kwon T, and Cho D. An enhanced uplink scheduling algorithm based on voice activity for VoIP services in IEEE 802. 16d/e systems. IEEE Communications Letters 2005; 9(8): 691–692.
- Chakchai So-In, Jain R, Al-Tamimi A. A Scheduler for Unsolicited Grant Service (UGS) in IEEE 802. 16e Mobile WiMAX Networks. IEEE Systems Journal 2010 ; 4(4): 487-494.

Index Terms

Computer Science
Wireless

Keywords
Evaluating the Performance of IPTV over Fixed WiMAX

IPTV  QoS  modulation and coding  WiMAX  OPNET  performance study.