

## DAFTAR PUSTAKA

- [1] UIC Communications Department, “UIC activity report 2020-2021,” International Union of Railways, Tech. Rep., April 2022.
- [2] UIC and J. Evangelou, “FRMCS and 5G for rail: Challenges, achievements and opportunities,” vol. 1, 2020.
- [3] Q. Y. Li, Z. D. Zhong, M. Liu, and W. W. Fang, “Chapter 14 - smart railway based on the internet of things,” in *Big Data Analytics for Sensor-Network Collected Intelligence*, ser. Intelligent Data-Centric Systems, H.-H. Hsu, C.-Y. Chang, and C.-H. Hsu, Eds. Academic Press, 2017, pp. 280–297. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/B9780128093931000143>
- [4] R. Chen, W.-X. Long, G. Mao, and C. Li, “Development trends of mobile communication systems for railways,” *IEEE Communications Surveys & Tutorials*, vol. 20, no. 4, pp. 3131–3141, 2018.
- [5] B. Ai, A. F. Molisch, M. Rupp, and Z.-D. Zhong, “5G key technologies for smart railways,” *Proceedings of the IEEE*, vol. 108, no. 6, pp. 856–893, 2020.
- [6] A. Gonzalez-Plaza, J. Moreno, I. Val, A. Arriola, P. M. Rodriguez, F. Jimenez, and C. Briso, “5g communications in high speed and metropolitan railways,” in *2017 11th European Conference on Antennas and Propagation (EUCAP)*, 2017, pp. 658–660.
- [7] “Future railway mobile communication system (frmcs),” <https://www.nokia.com/networks/industries/railways/frmcs/>, 2023, accessed: 2023-02-15.
- [8] X. Lin, “An overview of 5g advanced evolution in 3gpp release 18,” *arXiv preprint arXiv:2201.01358*, 2022.
- [9] European Rail Infrastruktur Managers EIM, “Future railway mobile communication system eim expectations and key challenges,” vol. 1, 2016.
- [10] ECC, “ECC Decision of 20 November 2020 on harmonised use of the paired frequency bands 874.4-880.0 mhz and 919.4-925.0 mhz and of the unpaired frequency band 1900-1910 mhz for Railway Mobile radio (RMR),” <https://docdb.cept.org/document/16736>, 2022, [Accessed 25-07-2023].

- [11] ETSI, “Rail Communications (RT) — etsi.org,” <https://www.etsi.org/technologies/rail-communications>, 2021, [Accessed 25-07-2023].
- [12] B. Ai, X. Cheng, T. Kürner, Z.-D. Zhong, K. Guan, R.-S. He, L. Xiong, D. W. Matolak, D. G. Michelson, and C. Briso-Rodriguez, “Challenges toward wireless communications for high-speed railway,” *IEEE Transactions on Intelligent Transportation Systems*, vol. 15, no. 5, pp. 2143–2158, 2014.
- [13] N. Giordano, *College Physics: Reasoning and Relationships*. Cengage Brooks-Cole, 2009, no. v. 2. [Online]. Available: <https://books.google.co.id/books?id=e6tYjwEACAAJ>
- [14] M. H. Maulana Sambas, A. Khamid Ridwanuddin, K. Anwar, I. A. Rangkuti, and N. Mufti Adriansyah, “Performances of future railway mobile communication systems under indonesia railway channel model,” in *2019 Symposium on Future Telecommunication Technologies (SOFTT)*, vol. 1, 2019, pp. 1–6.
- [15] M. Okada, H. Takayanagi, and H. Yamamoto, “Array antenna assisted doppler spread compensator for ofdm,” *European Transactions on Telecommunications*, vol. 13, pp. 507–512, 09 2002.
- [16] N. N. Amalia, K. Anwar, and N. M. Adriansyah, “Doppler spread compensator having multiple input multiple output (mimo) capability for future railway mobile communication system (frmcs),” vol. 1, 2021.
- [17] S. A. Ashraf, K. K. Nagalapur, G. Fodor, C. Kuhlins, B. Cellarius-Toups, S. Sorrentino, and D. Rothbaum, “5g-powered frmcs,” Tech. Rep., March 2022. [Online]. Available: <https://www.ericsson.com/en/reports-and-papers/white-papers/5g-powered-frmcs>
- [18] H. Harada and R. Prasad, *Simulation and software radio for mobile communications*. Artech House, 2002.
- [19] 3GPP, “NR; Physical channels and modulation,” 3rd Generation Partnership Project (3GPP), Technical Specification (TS) 38.211, 09 2021, version 16.7.0. [Online]. Available: <https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3213>
- [20] M. Pätzold, M. Patzold, and M. Paetzold, *Mobile fading channels*. Wiley Online Library, 2002.
- [21] W. C. Jakes and D. C. Cox, *Microwave mobile communications*. Wiley-IEEE press, 1994.

- [22] D. Fan, Z. Zhong, G. Wang, and F. Gao, “Doppler shift estimation for high-speed railway wireless communication systems with large-scale linear antennas,” in *2015 International Workshop on High Mobility Wireless Communications (HMWC)*. IEEE, 2015, pp. 96–100.
- [23] Y. Yang and P. Fan, “Doppler frequency offset estimation and diversity reception scheme of high-speed railway with multiple antennas on separated carriage,” *Journal of Modern Transportation*, vol. 20, no. 4, pp. 227–233, 2012.
- [24] A. Zaidi, F. Athley, J. Medbo, U. Gustavsson, G. Durisi, and X. Chen, *5G Physical Layer: principles, models and technology components*. Academic Press, 2018.
- [25] E. Biglieri, R. Calderbank, A. Constantinides, A. Goldsmith, A. Paulraj, and H. V. Poor, *MIMO wireless communications*. Cambridge university press, 2007.
- [26] *Universal Software Radio Peripheral*, Ettus Research, 05 2017, rev. 1.2.
- [27] W. Wahidin, A. Darmawan, M. Z. N. Tajrid, K. Anwar, and N. M. Adrian-syah, *Towards the Realization of 5G Future Railway Mobile Communication Systems (FRMCS): Channel Coding, Synchronization, and Performance at the Best Frequency*. Universitas Telkom, S1 Teknik Telekomunikasi, 2023, vol. 1.