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Rain Fade Analysis on Earth-to-Satellite Microwave Link Operating in Comoros (Conference Paper) [\(Open Access\)](#)

Thabiti, A.^a ✉, Malik, N.A.^a ✉, Rafiqul, I.M.^a ✉, Daoud, J.I.^b ✉

^aDepartment of Electrical and Computer Engineering, Malaysia

^bDepartment of Science in Engineering Faculty of Engineering, International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur, 53100, Malaysia

Abstract

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Microwave link operates at high frequency approximately 10 GHz and above, and it suffers from high attenuation in the tropical region due to high rain intensity. Therefore, a microwave designer should consider this effect in the design so that the link can be operated with good quality of service, high availability and reliability. This study is about analysis of rain fade in a tropical country, Comoros, where the rain intensity was considered from ITU-R Recommendation. This rain intensity was used to determine the rain fade for earth-to-satellite of links operating in this country at L, C, Ka, Ku and V bands in horizontal, vertical and circular for 0.001% to 1% of exceeded per year. From the analysis, it was found that the link has availability to work from 99.999% to 99% with least effects in all frequency bands at vertical polarization, except in V-band. At 99% of availability, it shows that B-PSK is the best technique for modulation to make the proposed link more reliable. To attain 10dB fade margin which allows the antenna to reach certain quality of services, the gain receiver, diameter and figure of merit were increased while the footprint was maximized. The outcome of this study will be useful resources to upgrade the availability and reliability of earth to satellite microwave link in Comoros. © Published under licence by IOP Publishing Ltd.

SciVal Topic Prominence ⓘ

Topic: Rain | Electromagnetic wave attenuation | ITU-R model

Prominence percentile: 89.600 ⓘ

Indexed keywords

Engineering controlled terms:

Antennas Frequency bands Infiltration Microwave links Microwaves
Quality of service Satellite links Satellites Tropics

Engineering uncontrolled terms

Figure of merits High availability High frequency HF ITU-R recommendation
Rain-intensity Tropical countries Tropical regions Vertical polarization

Engineering main heading:

Rain

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(2017) *International Journal of Satellite Communications and Networking*

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Hendrantoro, G. , Bultitude, R.J.C. , Falconer, D.D.

(2002) *IEEE Journal on Selected Areas in Communications*

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Shrestha, S. , Nadeem, I. , Ghimire, J.

(2017) *International Conference on Information and Communication Technology Convergence: ICT Convergence Technologies Leading the Fourth Industrial Revolution, ICTC 2017*

References (11)

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- ☐ 1 Freeman, R.L.
Radio System Design for Telecommunications: Third Edition
(2006) *Radio System Design for Telecommunications: Third Edition*, pp. 1-880. Cited 97 times.
<http://onlinelibrary.wiley.com.ezproxy.um.edu.my/book/10.1002/0470050446>
ISBN: 978-047175713-9
doi: 10.1002/0470050446
[View at Publisher](#)

- ☐ 2 Islam, M.R., Rahman, M.A., Hossain, S.K.E., Azad, M.S.
Rain fade analysis on earth-space microwave link in a subtropical region
(2008) *Proceedings of ICECE 2008 - 5th International Conference on Electrical and Computer Engineering*, art. no. 4769318, pp. 793-798. Cited 5 times.
ISBN: 978-142442015-5
doi: 10.1109/ICECE.2008.4769318
[View at Publisher](#)

- ☐ 3 Shrestha, S., Choi, D.-Y.
Characterization of Rain Specific Attenuation and Frequency Scaling Method for Satellite Communication in South Korea ([Open Access](#))
(2017) *International Journal of Antennas and Propagation*, 2017, art. no. 8694748. Cited 14 times.
<http://www.hindawi.com/journals/ijap/>
doi: 10.1155/2017/8694748
[View at Publisher](#)

- ☐ 4 Yeo, J.X., Lee, Y.H., Ong, J.T.
Rain attenuation prediction model for satellite communications in tropical regions
(2014) *IEEE Transactions on Antennas and Propagation*, 62 (11), art. no. 6899607, pp. 5775-5781. Cited 26 times.
doi: 10.1109/TAP.2014.2356208
[View at Publisher](#)

- ☐ 5 Rashid, M.M., Islam, M.R., Alam, A.H.M.Z., Khan, S., Khalifa, O.O., Rahman, M.A.
Rain fade and it's effect analysis for earth-to-satellite microwave link based on measured rainfall statistics in Bangladesh
(2009) *Proceedings - MICC 2009: 2009 IEEE 9th Malaysia International Conference on Communications with a Special Workshop on Digital TV Contents*, art. no. 5431505, pp. 244-249. Cited 3 times.
ISBN: 978-142445532-4
doi: 10.1109/MICC.2009.5431505
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