172
Accession number:12571228
Title:Link Budget Analysis for Terahertz Fixed Wireless Links
Authors:Schneider, T. (1); Wiatrek, A. (1); Preussler, S. (1); Grigat, M. (2); Braun, R. (2)
Author affiliation:(1) Inst. fur Hochfrequenztech., Deutsche Telekom Hochschule fur Telekommunikation Leipzig, Leipzig, Germany; (2) Telekom Innovation Labs., Deutsche Telekom AG, Darmstadt, Germany
Source title:IEEE Transactions on Terahertz Science and Technology
Abbreviated source title:IEEE Trans. Terahz. Sci. Technol. (USA)
Volume:2
Issue:2
Publication date:March 2012
Pages:250-6
Language:English
ISSN:2156-342X
CODEN:ITTSBX
Document type:Journal article (JA)
Publisher:IEEE
Country of publication:USA
Material Identity Number:GR96-2012-002
Abstract:Due to the broad bandwidths, terahertz (THz)-waves offer the possibility for wireless transmission of high data rates. Especially, broadband wireless access over short ranges and fixed wireless links based on THz-waves are very promising. They can be incorporated as a bridge for optical networks or an alternative for the connection of wireless stations in difficult environments, to transmit next generation HDTV signals or for the broadband connection of servers in a data center, for instance. The frequency range between 300 and 900 GHz is very promising for these applications since the possible bandwidth is very high and first electronic circuits will become available on the market soon. However, contrary to wireless links in the lower GHz-bands, the free-space path-loss is quite high and the attenuation due to molecules in the air or water droplets can significantly decrease the transmittable data rates in this frequency range. Here the basic properties of THz-waves will be investigated and the maximum achievable data rates for fixed wireless THz-links will be derived. In order to keep the considerations as general as possible, the derivations are based on simple assumptions and equations. Additionally, conclusions for the applicability of THz-waves for fixed wireless links with distances up to 1 km will be given and the special requirements for these systems will be discussed. As we will show, high data rates can only be transmitted via these links if transmitter and receiver antennas with very high gains are used. This requires an adaptive control of mechanical fluctuations.
Number of references:40
Inspec controlled terms:adaptive control - high definition television - optical fibre networks - radio links - receiving antennas - terahertz waves - transmitting antennas
Uncontrolled terms:terahertz - link budget analysis - fixed wireless links - THz-waves - HDTV signals - optical networks - free-space path-loss - water droplets - transmitter antennas - receiver antennas - adaptive control - broadband wireless access
Inspec classification codes:B6250 Radio links and equipment - B5270B Single antennas

Treatment:Practical (PRA)
Discipline:Electrical/Electronic engineering (B)
DOI:10.1109/TTHZ.2011.2182118
Database:Inspec