Volume 70, 2011 Issue 16

Telecommunications and Radio Engineering

Published **12** issues per year

ISSN Print: **0040-2508**

ISSN Online: **1943-6009**

SJR: 0.185

SNIP: 0.268

CiteScore™:: 1.5

H-Index: 22

Indexed in

TERAHERTZ RANGE TELECOMMUNICATION SYSTEMS

Volume 70, Issue 16, 2011, pp. 1477-1487
DOI: 10.1615/TelecomRadEng.v70.i16.60

Mikhail E. Ilchenko
Research Institute for Telecommunications, NTUU "KPI" 37, Peremoha Ave., 03056 Kyiv, Ukraine

T. M. Narytnyk
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" (NTUU "KPI") Peremohy Ave, 37, Kyiv, 03056, Ukraine

Anatoly Ivanovich Fisun
A.Ya. Usikov Institute of Radio Physics and Electronics, National Academy of Sciences of Ukraine, 12, Academician Proskura St., Kharkov 61085, Ukraine

Oleg I. Belous
A. Usikov Institute of Radio Physics and Electronics, National Academy of Sciences of Ukraine, 12, Academician Proskura Str., Kharkiv 61085, Ukraine

ABSTRACT

This research paper delves into the level of development and advantages of application of telecommunication systems of terahertz range (100GHz to 3000GHz), including the fields of application for the developed technologies as well as the outstanding problems and feasible methods of their solution. Unfortunately, the frequency resource of the currently used radio-frequency band is physically incapable of transmitting very high-speed and high-speed data torrents via a radio channel. The application of multilevel modulations that could allow for the increase in speed is rather limited whereas the application of higher frequencies allows for the use of broader frequency band to transfer the gigabit torrents. This innovative approach has many advantages, in particular, confidentiality of data transmission and narrow-beam radio emission. This

paper also gives examples of available systems using the state-of-the-art semiconductor CMOS, SiGe and GaAs technologies and it also describes their specific features.

KEY WORDS: terahertz range, radio channel, telecommunication system gigabit data flow, semiconductor and nanotechnologies

CITED BY

1. Narytnik T., Uryvsky L., Lutchak O., Osypchuk S., Gigabit wireless system in 130 GHz band based on 802.11n transceivers, 2016 IEEE International Black Sea Conference on Communications and Networking (BlackSeaCom), 2016. Crossref
2. Narytnik T., Uryvsky L., Lutchak O., Osypchuk S., 1.2 Gbps radio link implementation in THz band based on IEEE 802.11n standard, 2016 IEEE International Black Sea Conference on Communications and Networking (BlackSeaCom), 2016. Crossref
3. Narytnik Teodor, The ways of creation and use of telecommunication systems in the terahertz band transport distribution 5G mobile networks, 2016 Third International Scientific-Practical Conference Problems of Infocommunications Science and Technology (PIC S&T), 2016. Crossref
4. Narytnik T., Uryvsky L., Lutchak O., Osypchuk S., Gigabit wireless system in 130 GHz band based on 802.11n transceivers, 2016 IEEE International Black Sea

Conference on Communications and Networking (BlackSeaCom), 2016. Crossref

5. Avdieienko Hlib, Yakornov Yevhenii, Application of Spatial Signal Processing by the Form of the Electromagnetic Wave Phase Front in Wireless Communication Systems, in Advances in Information and Communication Technologies, 560, 2019. Crossref
6. Avdeyenko Gleb, Application of Spatial Signal Processing for Bandwidth Capability Improvement of Radio Relay Link, 2019 IEEE International Scientific-Practical Conference Problems of Infocommunications, Science and Technology (PIC S&T), 2019. Crossref
7. Avdeyenko Gleb, Prototype of unidirectional microwave wireless communication system with spatial signals processing, 2018 International Conference on Information and Telecommunication Technologies and Radio Electronics (UkrMiCo), 2018. Crossref
8. Ilchenko M., Narytnyk T., Avdeyenko G., Wireless Communication Systems of Terahertz Frequency Range, in Current Trends in Communication and Information Technologies, 212, 2021. Crossref
9. Feng Jianxin, Xu Jingjing, Pan Chengsheng, Ding Yuanming, Fang Hui, A Novel Adaptive Terahertz System for Reliable and Efficient Maritime Communications Under Hostile Sea Conditions, IEEE Access, 10, 2022. Crossref
10. Ilchenko M.Yu., Narytnyk T.M., Prysiazhnyi V.I., Kapshtyk S.V., Matvienko S.A., Space infrastructure of the Internet of things. State and prospects of development, Kosmìčna nauka ì tehnologìâ, 27, 6, 2021. Crossref

11. Sergienko Ivan V., Information Technologies as Tools for Studying Complex Processes, in Topical Directions of Informatics, 78, 2014. Crossref

LEARNING IN CROWDSOURCED ENVIRONMENTS: WHERE ARE WE GOING AND HOW DO WE GET THERE?

International Journal on Innovations in Online Education, Vol.2, 2018, issue 4
Chirag Shah, Manasa Rath

EFFICIENCY OF ADAPTIVE POLARIZATION FILTERS AT ARBITRARY NOISE PARAMETERS

Journal of Automation and Information Sciences, Vol.31, 1999, issue 1-3
D. M. Piza

TECHNOLOGIES FOR DIGITAL TELEVISION BROADCASTING IN THE INTERNET AND CELLULAR NETWORKS

Telecommunications and Radio Engineering, Vol.67, 2008, issue 19
A. M. Sukhov, A. P. Platonov, I. N. Bondarev

MILLIMETER-WAVE BAND MODULES

Telecommunications and Radio Engineering, Vol.63, 2005, issue 7-12
N. F. Karushkin

Latest Issue

A NOVEL ENERGY AWARE CLUSTER HEAD SELECTION ALGORITHM FOR WIRELESS SENSOR NETWORKS

Devathoti Rajendra Prasad, Kamili Jagadeesh Babu, V. N. Koteswara Rao Devana, Pasumarthi Srinivasa Rao, Yamarthi Mallikaruna Rao, Veera Swamy Ammisetty

---

ENERGY-EFFICIENT ROUTING PROTOCOL IN MOBILE *AD HOC* NETWORKS USING HYBRID WOLF BIRD AND PORTIA SPIDER OPTIMIZATION ALGORITHM

Guntupalli Gangaprasad, B. Seetharamanjaneyulu

TERNARY ZERO CORRELATION ZONE SEQUENCE SETS WITH PERFECT PERIODIC CORRELATIONS

B. Premalatha, T. D. Bhatt, G. Srikanth

A NOVEL HIGHLY COMPACT MULTIBAND MILLIMETER WAVE ANTENNA FOR WIRELESS

APPLICATIONS

Deepshika Borundiya, Tanweer Ali

RESEARCH ON VULNERABILITY ANALYSIS METHOD OF FRAGMENT DAMAGE ELEMENT TO IRRADIATED RADAR TARGET

Hongzhi Zhao, Minghui Zheng, Zhengang Liang

Forthcoming Articles

DESIGN AND ANALYSIS OF TRI-NOTCHED CIRCULAR PATCH FSS-BASED UWB ANTENNA FOR RADAR AND SATELLITE SYSTEMS

Aditi Bhardwaj, Mohd Gulman Siddiqui, Amit Rathi, Apoorva Anand, Vyomika Jha, Khushi Mehendiratta

---

COMPARATIVE ANALYSIS OF RAIN-RATE DISTRIBUTION PREDICTIVE MODELS FOR MICROWAVE APPLICATION IN THE TROPICS

Modupe SANYAOLU, Chukwuemerie Obiorah, Oluropo Dairo, Gbenga Akinyemi

TWO-PORT MIMO ANTENNA FOR 5G NR APPLICATIONS

Arun Kumar Singh, Samarendra Nath Sur, Nitin Kumar Singh

DESIGN AND OPTIMIZATION OF ANTENNA ARRAY AT SUB-6GHZ BAND FOR 5G APPLICATIONS

Samarendra Nath Sur, Arun Kumar Singh, Navin Kumar Singh

INVESTIGATION OF INDOOR PATH LOSS PREDICTION MODELS FOR 5G WIRELESS NETWORKS AT 28 GHZ FOR DIFFERENT ANTENNA POLARIZATIONS

Tolulope Oladimeji, Tunji Erinle, Olusola Akinsanya

PATIENT DIABETIC RETINOPATHY DIAGNOSIS AND CLASSIFICATION MODEL USING INTERNET OF THINGS WITH CLOUD COMPUTING

PRASANNA R, Ragupathi T, Chitra Rengarajan