Proceedings of the 2018 7th International Conference on Computer and Communication Engineering, ICCCE 2018
16 November 2018, Article number 8539320, Pages 317-320
7th International Conference on Computer and Communication Engineering, ICCCE 2018; Kuala Lumpur; Malaysia; 19 September 2018 through 20 September 2018; Category numberCFP1839D-USB; Code 142740

Simulation of RF Patch Antenna Sensor for Biological Applications

(Conference Paper)

Yunos, M.F.A.B. ✉, Nordin, A.N. ✉, Khan, S. ✉

Department of Electrical and Computer Engineering, Kuliyyah of Engineering International Islamic University of Malaysia, Kuala Lumpur, Malaysia

Abstract

View references (10)

Diabetes affects hundreds of millions of people globally, and is a leading cause of death and disability worldwide. Patients must regularly monitor their blood glucose concentration to manage the disease. A non-invasive way of glucose monitoring using biosensor has emerged as an alternative technique. This work describes a contemporary approach of using patch antenna sensor in estimating the glucose level in blood. Focus of this work is to perform the simulation of sensor design using finite element analysis software, CST Microwave Studio. The geometry of sensors have been simulated where the results show the optimal design of feedline length was 11.25 mm at 1.98 GHz. The optimal design was then simulated in COMSOL Multiphysics for evaluating frequency shift in different medium permittivity of air, water and blood. The increase of permittivity will result in decrease of resonance frequency. © 2018 IEEE.

SciVal Topic Prominence

Topic: Biosensors | Dielectric spectroscopy | Glucose

Prominence percentile: 85.776

Author keywords

Blood glucose monitoring | COMSOL | CST | Non-invasive | Patch antenna | Simulation

Indexed keywords

Engineering controlled terms: Bioinformatics | Blood | Computer software | Glucose | Microwave antennas | Microwave sensors | Optimal systems | Permittivity | Slot antennas

Engineering uncontrolled terms: Biological applications | Blood glucose concentration | Blood glucose monitoring | COMSOL | Finite element analysis software | Non-invasive | Resonance frequencies | Simulation

Engineering main heading: Microstrip antennas

Funding details

Funding sponsor	Funding number	Acronym

Funding sponsor	Funding number	Acronym
Ministry of Higher Education, Malaysia		MOHE
Ministry of Higher Education, Malaysia	FRGS17-030-0596	MOHE

Funding text

ACKNOWLEDGMENT This work is supported by Malaysia Ministry of Higher Education (MOHE) under the Fundamental Research Grant Scheme (FRGS) FRGS17-030-0596.

ISBN: 978-153866991-4
Source Type: Conference Proceeding
Original language: English
DOI: 10.1109/ICCCE.2018.8539320
Document Type: Conference Paper
Publisher: Institute of Electrical and Electronics Engineers Inc.

References (10)

View in search results format >

All | Export | Print | E-mail | Save to PDF | Create bibliography

1 *Diagnosis and Classification of Diabetes Mellitus | Diabetes Care*
[Accessed: 03-Aug-2018]
http://care.diabetesjournals.org/content/37/Supplement_1/S81

2 Ripsin, C.M., Kang, H., Urban, R.J.
Management of blood glucose in type 2 diabetes mellitus
(2009) *American Family Physician*, 79 (1), pp. 29-36+42. Cited 106 times.
http://www.aafp.org/afp/20090101/29.pdf
View at Publisher

3 Coster, S., Gulliford, M.C., Seed, P.T., Powrie, J.K., Swaminathan, R.
Monitoring blood glucose control in diabetes mellitus: A systematic review
(2000) *Health Technology Assessment*, 4 (12), pp. i-iv+1-84. Cited 95 times.

4 Makaram, P., Owens, D., Aceros, J.
Trends in nanomaterial-based non-invasive diabetes sensing technologies
(2014) *Diagnostics*, 4 (2), pp. 27-46. Cited 42 times.

5 Yoo, E.-H., Lee, S.-Y.
Glucose biosensors: An overview of use in clinical practice (Open Access)
(2010) *Sensors*, 10 (5), pp. 4558-4576. Cited 337 times.
http://www.mdpi.com/1424-8220/10/5/4558/pdf
doi: 10.3390/s100504558
View at Publisher

6 Cespedes, F.A.
(2017) *RF Sensing System for Continuous Blood Glucose Monitoring*
PhD Thesis, University of South Florida

7 Samarthay, V., Pundir, S., Lal, B.
Designing and optimization of inset fed rectangular microstrip patch antenna (rmpa) for varying inset gap and inset length
(2014) *Int. J. Electron. Electr. Eng*, 7 (9), pp. 1007-1013. Cited 5 times.

8 Zainuddin, A.A., Nordin, A.N., Rahim, R.A., Ralib, A.A.M., Khan, S., Guines, C., Chatras, M., (...), Pothier, A.
Verification of quartz crystal microbalance array using vector network analyzer and openQCM (Open Access)

(2018) *Indonesian Journal of Electrical Engineering and Computer Science*, 10 (1), pp. 84-93. Cited 2 times.
http://www.iaescore.com/journals/index.php/IJEECS/article/download/10889/8176
doi: 10.11591/ijeecs.v10.i1.pp84-93

View at Publisher

9 Turgul, V., Kale, I.
Characterization of the complex permittivity of glucose/water solutions for noninvasive RF/Microwave blood glucose sensing

(2016) *Conference Record - IEEE Instrumentation and Measurement Technology Conference*, 2016-July, art. no. 7520546. Cited 14 times.
http://ieeexplore.ieee.org/xpl/conferences.jsp
ISBN: 978-146739220-4
doi: 10.1109/I2MTC.2016.7520546

View at Publisher

10 Morshidi, W.H.W., Zaharudin, Z., Khan, S., Nordin, A.N., Shaikh, F.A., Adam, I., Kader, K.A.
Inter-digital sensor for non-invasive blood glucose monitoring

(2018) *2018 IEEE International Conference on Innovative Research and Development, ICIRD 2018*, pp. 1-6.
http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=8370763
ISBN: 978-153865696-9
doi: 10.1109/ICIRD.2018.8376339

View at Publisher

‹ Back to results | 1 of 3 Next ›

^ Top of page