The Blindspot of Electromagnetic Interference Affecting Sensitive Medical Devices at Hospitals and Healthcare Facilities

Publisher: IEEE

Steve Chan ; Marco Zennaro ; Ermanno Pietrosemoli ; Marco Rainone ; Ika Oktavianti ; Parnmook Nopphawan All Authors

Abstract:
Electromagnetic interference (EMI) can affect a hospital's sensitive medical equipment when the EMI is powerful enough and close enough to cause partial or complete failure of the equipment or its sub systems. Particularly amidst a lack of EMI shielding, the closer in proximity the EMI is to susceptible medical equipment, the chance of interference grows and is more likely to occur. Failure of critical electronic medical equipment can be life-threatening and should be prevented whenever possible. Power recycling/re-calibration time can be a lengthy process, so EMI should be mitigated to the maximum extent possible. The adverse impact of EMI, as pertains to sensitive medical devices, may only be transient in some instances, but it may also have profound impact leading to patient injury. True EMI immunity can only be ascertained by careful measurement and testing, and this is usually not performed routinely as hospitals and healthcare facilities have rapidly expanded. Indeed, while alternate current (AC) powerline EMI filters may be commonly employed, oftentimes what is in plain sight is overlooked - that of “noise” from a direct current (DC) source from a nearby instrument transformer, disconnecting switch, and similar components. The National Institutes of Health (NIH) have reported that several medical-related devices have had operational issues due to radiofrequency interference (RFI), particularly as pertains to super low frequency (SLF) (in the frequency range of 30 Hz up to 300 Hz), such as for power grids.

Published in: 2020 10th Annual Computing and Communication Workshop and Conference (CCWC)

Date of Conference: 6-8 Jan. 2020

Date Added to IEEE *Xplore*: 12 March 2020

ISBN Information:

INSPEC Accession Number: 19451773

DOI: 10.1109/CCWC47524.2020.9031203

Publisher: IEEE

Conference Location: Las Vegas, NV, USA, USA

More Like This

Internet Of Things (IOT) enabled smart autonomous hospital management system - A real world health care use case with the technology drivers
2015 IEEE International Conference on Computational Intelligence and Computing Research (ICCIC)
Published: 2015

Consumption Emotions and its Influence on Customer Behavior in the Context of Health Care Service An Empirical Study in Clinical Hospitals in China
2007 International Conference on Service Systems and Service Management
Published: 2007

Show More