

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING

Website: <https://cde.nus.edu.sg/ece>

Area: Microwave & Radio Frequency

Host: Professor Chen Zhi Ning

Jointly Organized by

Department of ECE/NUS and IEEE Singapore RFID Chapter

Merlion RFID Forum 2023 Paper Sharing Series

TOPIC	:	Ultrawideband Tightly Coupled Phased Array Antenna with a Simple and Efficient Feed Strategy
SPEAKER	:	Professor Zhang Cheng Hao Southeast University, China
DATE	:	Thursday, 21 September 2023
TIME	:	4:00PM to 5:00PM
VENUE	:	Block E7, E7-03-09, Seminar Room 4 College of Design and Engineering, National University of Singapore Alternatively, Join Zoom Meeting https://nus-sg.zoom.us/j/81662611166 [Registration is required] Meeting ID: 816 6261 1166 Passcode: 354347

ABSTRACT

This article presents a novel low-profile ultra-wideband and wide-scanning array antenna using the transversely connected folded tightly coupled dipoles array (TCF-TCDA). The tightly coupled folded dipole arms are used to extend the operational frequency band with a simple feed structure. The capacitively-loaded metallic walls are adopted to move the problematic common-mode resonance out of the desired band and mitigate the bandwidth-limiting loop mode at the lower frequency, as well as reducing the weight and cost. A meta-surface-based wide-angle impedance matching (MS-WAIM) layer is used to improve the beam scanning ability and lower the antenna profile, which consists of the star-shaped patches loaded on the dipole element. To demonstrate the wideband and wide scanning-range capability, a prototype is designed with an 8:1 bandwidth (0.41–3.3 GHz) at broadside, a scanning range of $\pm 75^\circ$ from 0.5 to 3.25 GHz (6.5:1 bandwidth) in the E- and D-planes and $\pm 50^\circ$ from 0.6 to 3.3 GHz (5.5:1 bandwidth) in the H-plane for active VSWR < 3.6. The proposed antenna has a very low profile, which is only $0.07\lambda_{\text{low}}$ at the lowest operating frequency. A 16×16 array prototype is fabricated and measured. Experimental results show that the design and measurement results have good agreement. The proposed antenna has an ultra-wide bandwidth, a wide scanning range, a very compact size and a low cost, which is a good candidate for modern wireless system.

BIOGRAPHY



Zhang-Cheng Hao (M'08-SM'15) received the B.S. degree in microwave engineering from XiDian University, Xi'an, China, in 1997, and the M.S. degree and Ph.D. degree in radio engineering from Southeast University, Nanjing, China, in 2002 and 2006, respectively. In 2006, he was a Postdoctoral Researcher with the Laboratory of Electronics and Systems for Telecommunications (LEST), École Nationale Supérieure des Télécommunications de Bretagne (ENSTB), Bretagne, France, where he was involved with developing millimeter-wave antennas. In 2007, he joined the Department of Electrical, Electronic and Computer Engineering, Heriot-Watt University, Edinburgh, U.K., as a Research Associate, where he was involved with developing multilayer integrated circuits and ultra-wide-band components. In 2011, he joined the School of Information Science and Engineering, Southeast University, Nanjing, China as a professor, and became a chief-professor at 2021. He holds over 30 granted patents and has authored over 200 referred technique papers. His current research interests involve microwave and millimeter-wave systems, massive phased array antennas, submillimeter-wave and terahertz components, passive circuits and phased array antennas. Dr. Hao has served as the TPC Chair/Co-Chair for many international conferences, including iWat2018, ICMMT 2019 and ISAP 2019. He has served as an Associate Editor for the IEEE Antennas and Wireless Propagation Letters, the IET Microwaves Antennas, & Propagation and the IET Electronics Letters, and a Guest Editor for the IEEE T-MTT Special Issue on IWS 2018. He is a Member of the IEEE MTT-21 Terahertz Technology and Applications, Technical Committees.

Email: zchao@seu.edu.cn

CONTACT PERSON

Dr. Xinyi Tang Tang_Xinyi@i2r.a-star.edu.sg

Dr. Peiqin Liu eleliup@nus.edu.sg

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