

# Low-Profile Monopolar Microstrip Antenna for Inter-Satellite Link of LEO Satellite Swarm

Dong-Hyo Lee  
National Satellite Operation &  
Application Center  
Korea Aerospace Research Institute  
(KARI)  
Daejeon 34133, Rep. of Korea

Sang-Cherl Lee  
National Satellite Operation &  
Application Center  
Korea Aerospace Research Institute  
(KARI)  
Daejeon 34133, Rep. of Korea

Chung-Min Lee  
Department of Information and  
Communication Engineering  
Hanbat National University  
Daejeon 34158, Rep. of Korea

Jin-Pyo Jang  
Department of Electronic Engineering  
Hanbat National University  
Daejeon 34158, Rep. of Korea

Seongmin Pyo  
Department of Information and  
Communication Engineering  
Hanbat National University  
Daejeon 34158, Rep. of Korea  
spyo@edu.hanbat.ac.kr

**Abstract**—This work for recent results presents a new low-profile microstrip antenna which radiated omni-directionally based on cutting-edge technologies for inter-satellite communication link (ISL) of low Earth orbit (LEO) satellite swarm. The proposed technologies show a very thin thickness of dielectric substrate for an omni-directional radiation pattern and wide operation frequency bandwidth. In order to obtain the low-profile monopolar microstrip antenna, the coaxial center direct feeder and the gaped coupling method which consisted the six arrayed hexagonal patches were used. The partially loaded slotted ground under the hexagonal patches were utilized to enhance radiation performances such as the increased impedance bandwidth. In addition, in order to achieve the improve bandwidth performance of the proposed antenna, the two non-fundamental even and odd modes were carefully investigated. To validate the feasibility of the proposed antenna operation, the theoretical parametric study has been carried for the dimension with optimum characteristics. At last, the proposed antenna showed monopolar radiation an ultra-thin substrate and broad bandwidth at the resonant frequency. The proposed antenna may be an excellent candidate for inter-satellite communication link for LEO satellite swarm.

*Keywords*—microstrip antenna, monopolar radiation, low-profile, improved bandwidth, circular polarization

**Acknowledgement** — This research was supported by the MSIT (Ministry of Science and ICT), Korea, under the ITRC (Information Technology Research Center) support program (IITP-2024-RS-2024-00437886) supervised by the IITP (Institute for Information & Communications Technology Planning & Evaluation).

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