

IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advances in Space-based Communication Technologies, Part 1 (5)

Author: Dr. Hyeon-Cheol Lee
Korea Aerospace Research Institute (KARI), Korea, Republic of, hlee@kari.re.kr

DRIFT RATE ANALYSIS OF THE KPLO X-BAND CENTER FREQUENCY

Abstract

Launched on Aug./05, 2022, the Korea Pathfinder Lunar Orbiter (KPLO) called Danuri, cruised the Ballistic Lunar Transfer (BLT) trajectory for 4.5 months, reached up to 1,550,000 km (Sep./27, 2022), and entered the lunar orbit in Dec./17, 2022. This is Rep. of Korea's first object moving beyond the earth's gravitational field. As operating the KPLO at a distance four times longer than that of the moon, the Korea Aerospace Research Institute (KARI) convinces that it can be operated even Mars in terms of communication distance. We are contacting the KPLO several times a day and accumulating flight and payload data. Among the RF characteristics of the transmitter used, the drift rate of the center frequency (F_c) is the critical item which affects receiving performance in the Korea Deep Space Antenna (KDSA) or NASA's Deep Space Networks (DSN). In this paper, the drift rate according to temperature in the thermal vacuum test is analyzed and the accumulated flight data of the drift rate are analyzed by classifying them into the cruise phase and the mission phase (lunar orbit). Then we investigate the performance of our transmitter according to the KDSA and the DSN receiver.