

## Electrical performance verification methodology for large reflector antennas: based on the P-band SAR payload of the ESA BIOMASS candidate mission - DTU Orbit (09/11/2017)

### Electrical performance verification methodology for large reflector antennas: based on the P-band SAR payload of the ESA BIOMASS candidate mission

In this paper, an electrical performance verification methodology for large reflector antennas is proposed. The verification methodology was developed for the BIOMASS P-band (435 MHz) synthetic aperture radar (SAR), but can be applied to other large deployable or fixed reflector antennas for which the verification of the entire antenna or payload is impossible. The two-step methodology is based on accurate measurement of the feed structure characteristics, such as complex radiation pattern and radiation efficiency, with an appropriate Measurement technique, and then accurate calculation of the radiation pattern and gain of the entire antenna including support and satellite structure with an appropriate computational software. A preliminary investigation of the proposed methodology was carried out by performing extensive simulations of different verification approaches. The experimental validation of the methodology included measurements of the prototype BIOMASS feed in several structural configurations with spherical, cylindrical, and planar near-field techniques. The measured characteristics for the feed structure were then used in the calculation of the radiation pattern and gain of the entire reflector antenna. The main emphasis of the work was on the assessment of the achievable pattern and gain uncertainty for the entire antenna and its compliance with the BIOMASS SAR requirements.

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Authors: Pivnenko, S. (Intern), Kim, O. S. (Intern), Nielsen, J. M. (Intern), Breinbjerg, O. (Intern), Pontoppidan, K. (Ekstern), Østergaard, A. (Ekstern), Lin, C. C. (Ekstern)

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