

# SMALL SCALE STATISTICS OF FIXED RELAY POLARIMETRIC LINKS AT 3.5 GHz

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**Abstract:**

The BuNGee project (Beyond Next Generation Mobile Broadband) aims to improve the overall infrastructure capacity density of mobile networks to an ambitious goal of 1Gbps/km<sup>2</sup> in economical cellular deployment [1]. Its innovative architecture combines a number of technological paradigms, such as self-backhauling, joint design of access and backhaul, etc. It relies on a Hub Base Station (HBS) connected to the operator back-haul on one side and to the distributed Hub Subscriber Stations (HSSs) or fixed relays on the other side. Whilst a large amount of viable channel models, e.g. 3GPP, COST 2100 and WINNER II, are available, they require some significant modifications to reflect the peculiarities of BuNGee architecture. In this contribution, small scale statistics of the HBS-to-HSS fixed relay polarimetric links are characterized by means of a ray-tracing tool and simultaneously compared with the reported parameters of existing models in the literature, e.g. WINNER II and IEEE 802.16 channel models. We focus on the spatial K-factor, correlation coefficients, Cross Polarization Discrimination (XPD) and Co-Polar-Ratio (CPR) in a BuNGee typical deployment scenario. The dependency of small scale statistics upon the innovative architecture (specifically, the narrow-beamwidth antennas) is investigated in detail. Furthermore, a tapped delay line model for fixed relay links with 20 MHz bandwidth is developed.