

The following formulae define the transmit and receive performance for the O3b satellite antenna relative gain contours. Each of the formulas defines the antenna gain, relative to beam peak over the range of 0 dB to -20 dB, as a function of the off-axis angle from boresight. The first formula of each pair defines the fastest gain roll-off which occurs in certain directions away from the boresight and the second formula gives the slowest gain roll-off which occurs in other directions. The actual gain roll-off in any direction always lies between the curves defined by these two equations. The actual gain roll-off in any given direction varies with the pointing direction of the steerable beam.

Transmit antennas:

$$G_{rel} = -0.0924 \theta^4 + 0.5198 \theta^3 - 1.8869 \theta^2 + 0.4989 \theta - 0.0399 \dots\dots\dots(1)$$

$$G_{rel} = -0.0116 \theta^4 + 0.2728 \theta^3 - 1.8507 \theta^2 + 0.7869 \theta - 0.1055 \dots\dots\dots(2)$$

where: G_{rel} is the relative gain (in dB) and $-20 \leq G_{rel} \leq 0$
 θ is the off-axis angle (in degrees) away from boresight

Receive antennas:

$$G_{rel} = -0.0907 \theta^4 + 0.2368 \theta^3 - 1.1019 \theta^2 - 0.2702 \theta + 0.0513 \dots\dots\dots(3)$$

$$G_{rel} = 0.1839 \theta^3 - 1.7049 \theta^2 + 0.2807 \theta + 0.0561 \dots\dots\dots(4)$$

where: G_{rel} is the relative gain (in dB) and $-20 \leq G_{rel} \leq 0$
 θ is the off-axis angle (in degrees) away from boresight