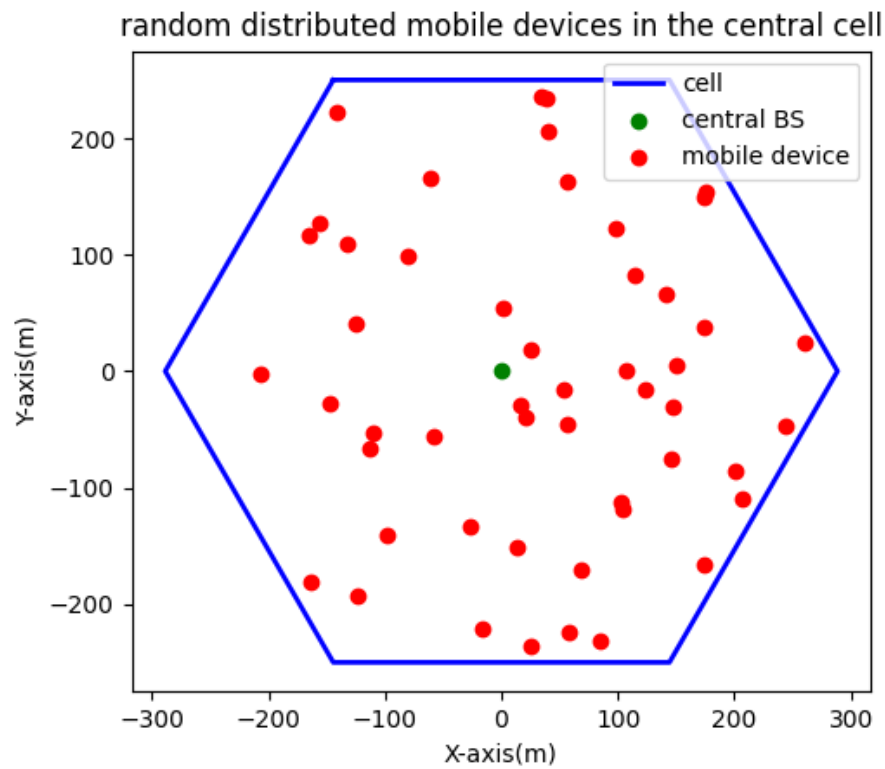


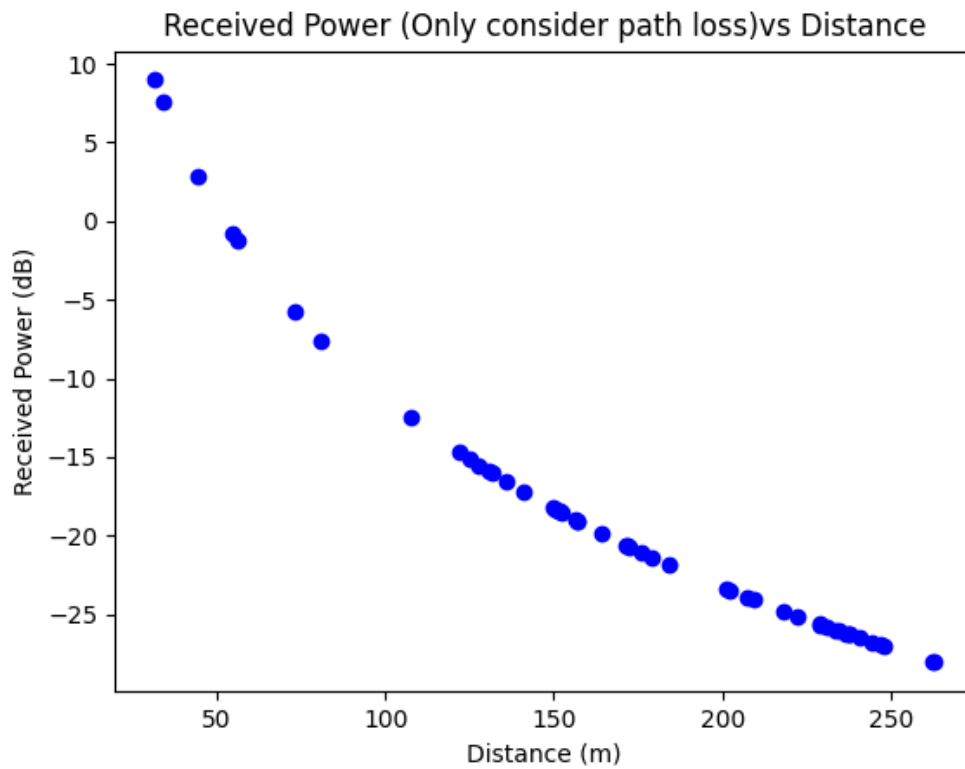
無線行動網路導論 HW2

B12901075 賴禹衡

第一題：

使用 Two-ray ground 模型





$P_{t_dbm} = 33$

$P_t = 10^{((P_{t_dbm} - 30) / 10)}$

$P_{m_dbm} = 23$

$P_m = 10^{((P_{m_dbm} - 30) / 10)}$

$h_{bs} = 51.5$

$h_{md} = 1.5$

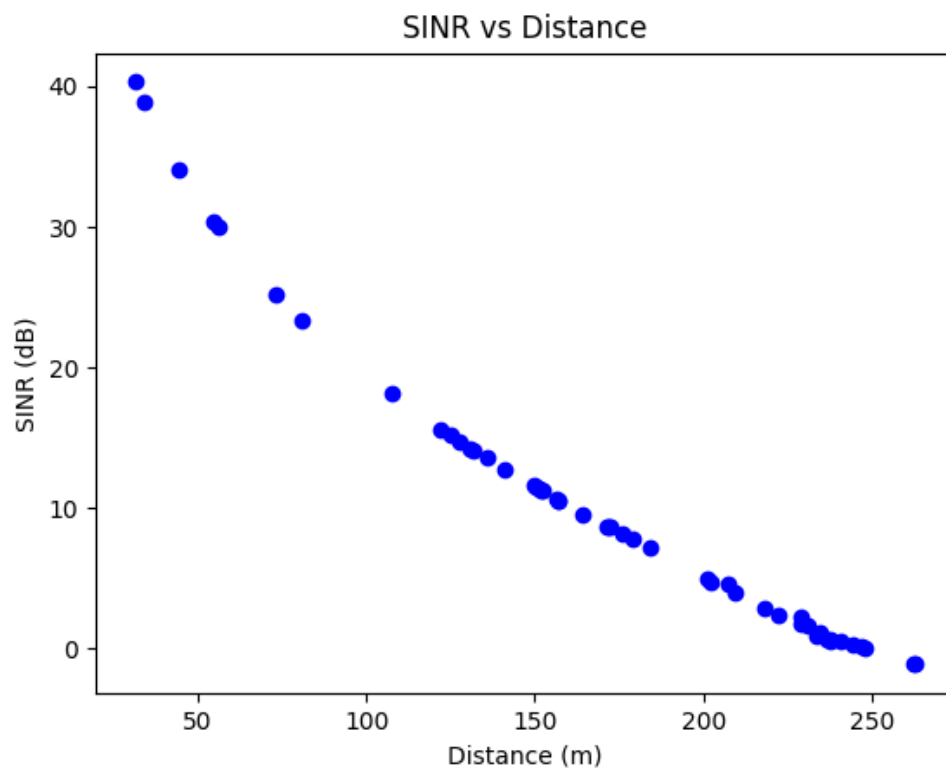
$G_{t_db} = 14$

$G_{r_db} = 14$

$G_t = 10^{(14/10)}$

$G_r = 10^{(14/10)}$

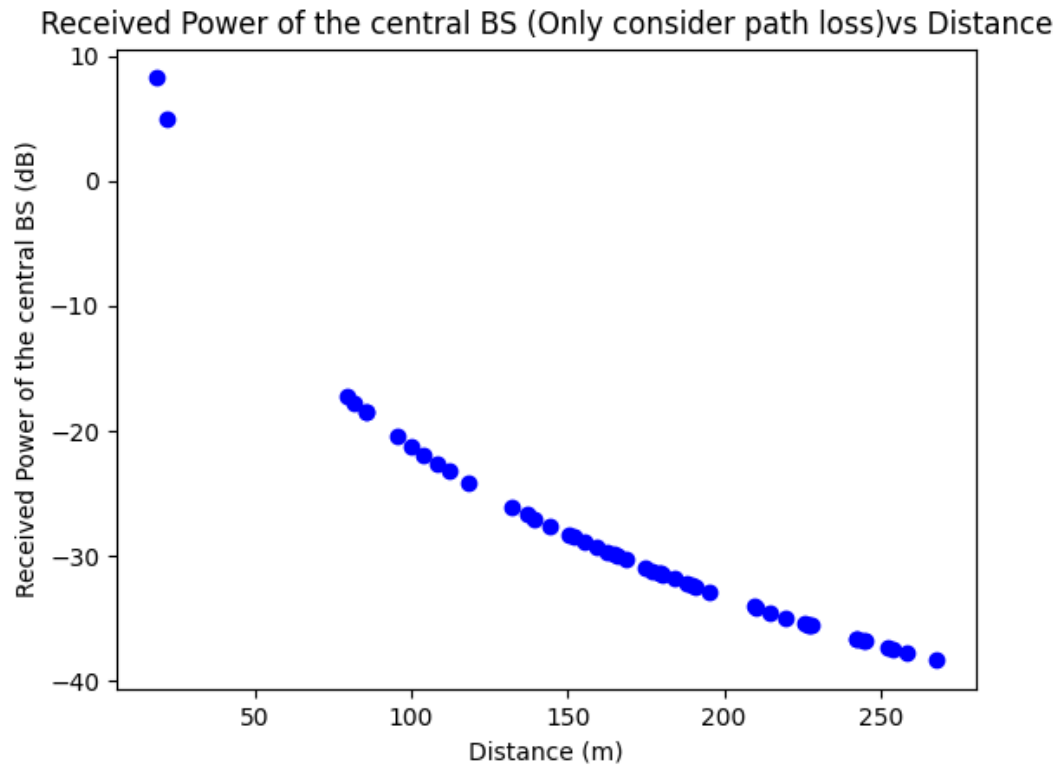
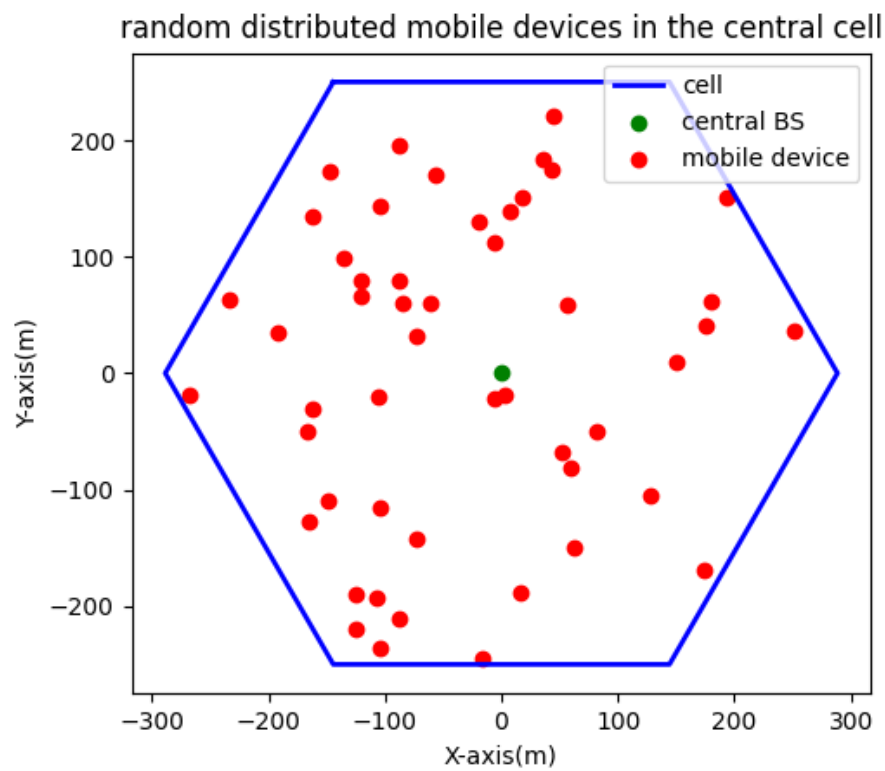
$P_r = P_t * (G_t * G_r * (h_{bs}^2 * h_{md}^2) / (d^4))$



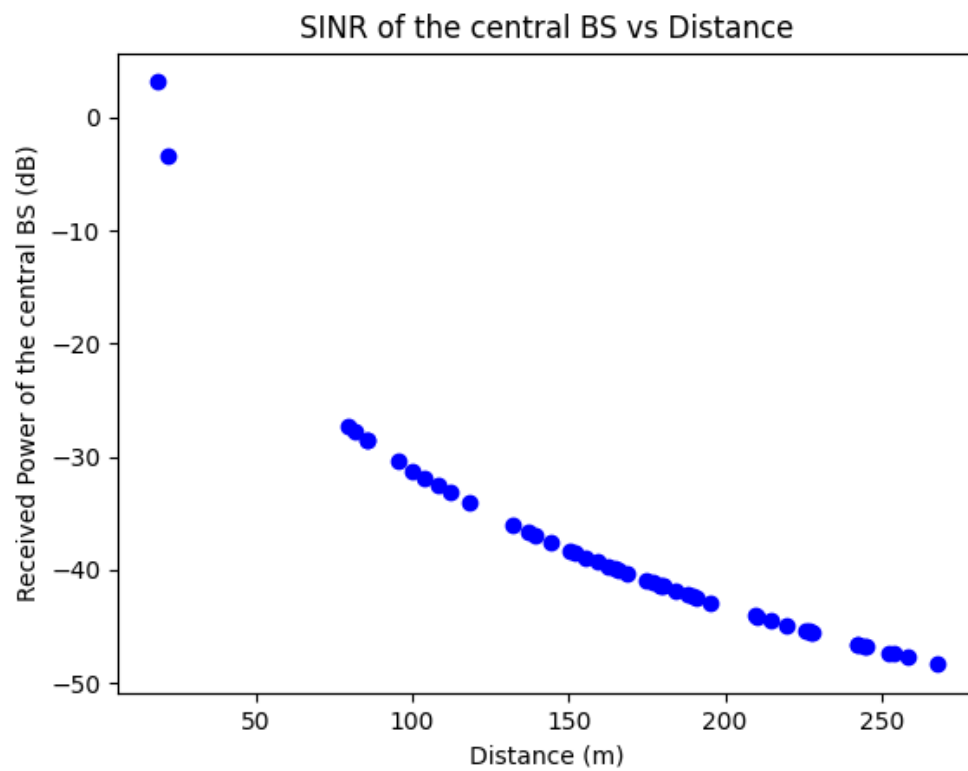
只考慮最靠近的六個 BS 所造成的影響

將每個點與 6BS 的 interference 相加再加上 thermal noise 可得 SINR 分母
 再用 $P_r = P_t \cdot (G_t \cdot G_r \cdot (h_{bs}^2) \cdot (h_{md}^2)) / (d^4)$ 得分子，再換成 dB

第二題：



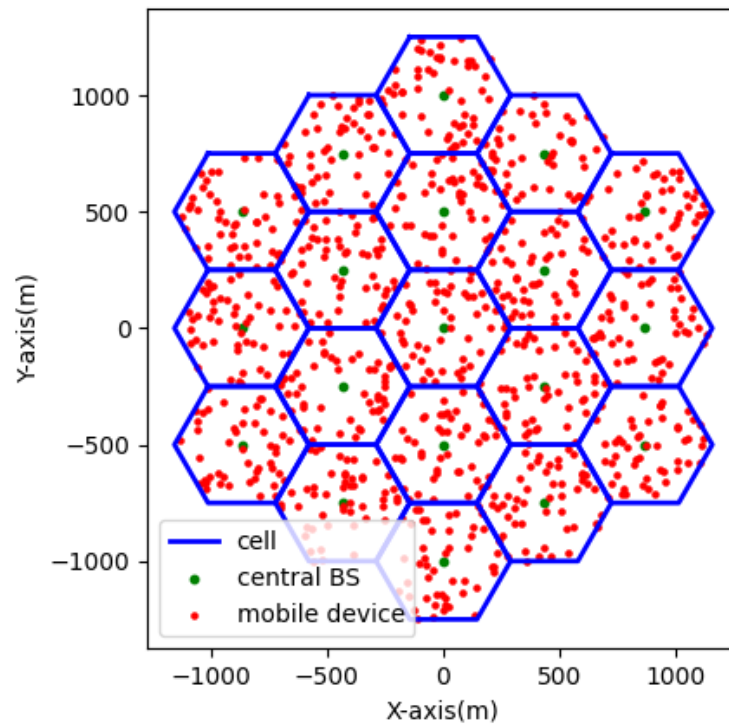
類似 1-2 但 $P_r = P_m \cdot (G_t \cdot G_r \cdot (h_{bs}^2) \cdot (h_{md}^2)) / (d^4)$



類似 1-3 但 interference 為其他 49 個點的傳給 BS 的 $P_r + \text{thermal_noise}$
 其中 $P_r = P_m \cdot (G_t \cdot G_r \cdot (h_{bs}^2) \cdot (h_{md}^2)) / (d^4)$

Bonus 1

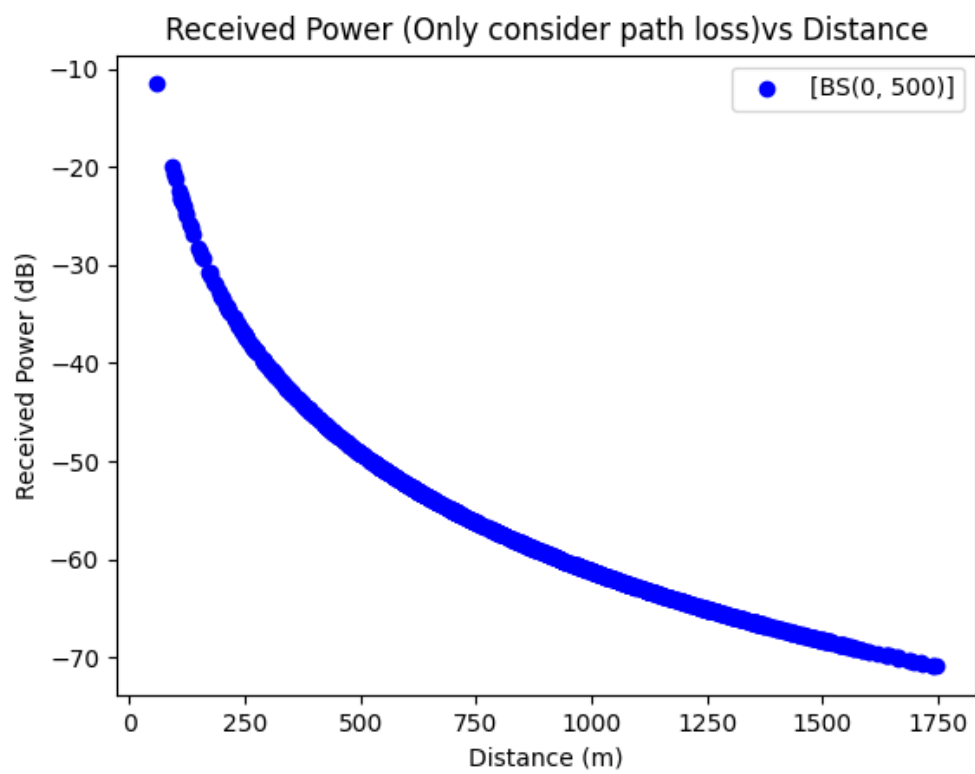
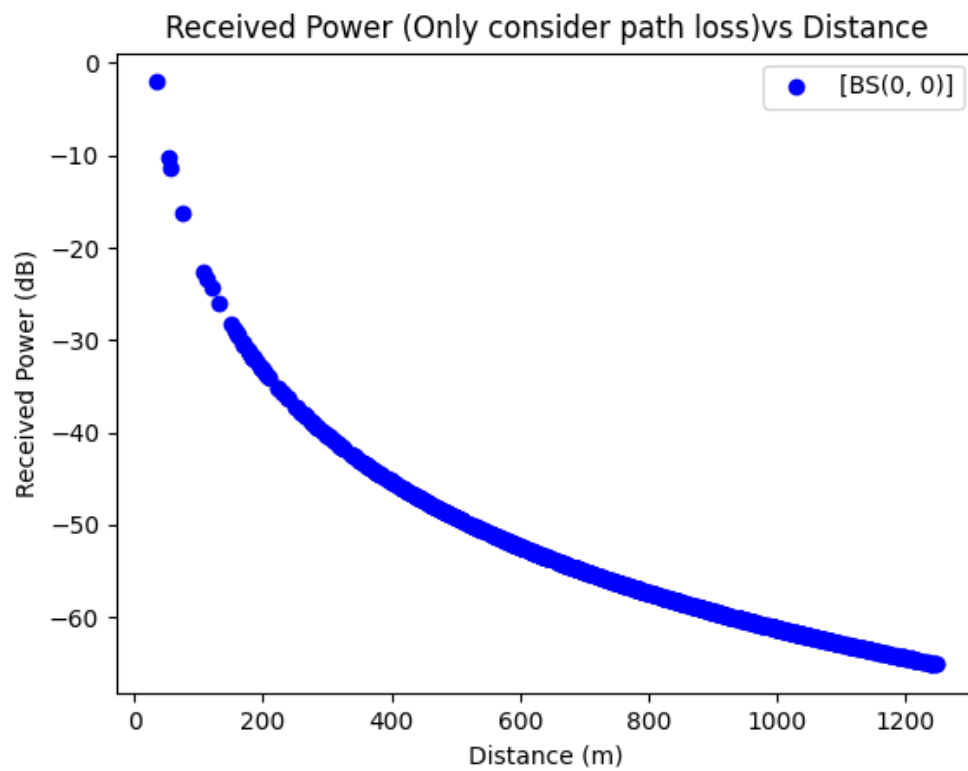
random distributed mobile devices in an urban area

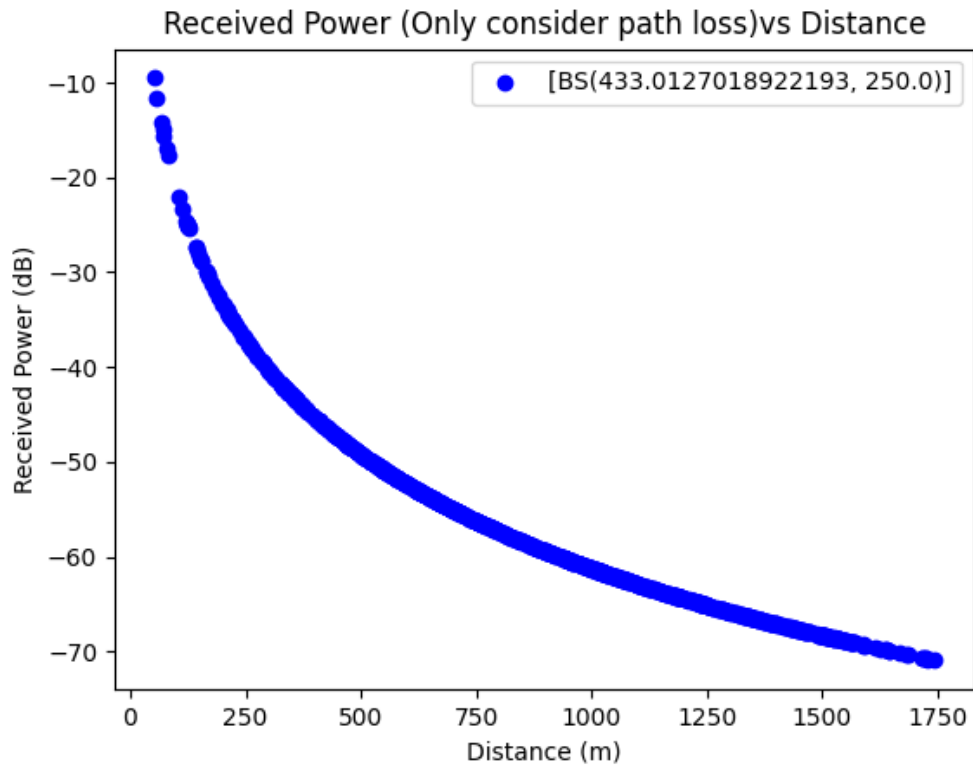
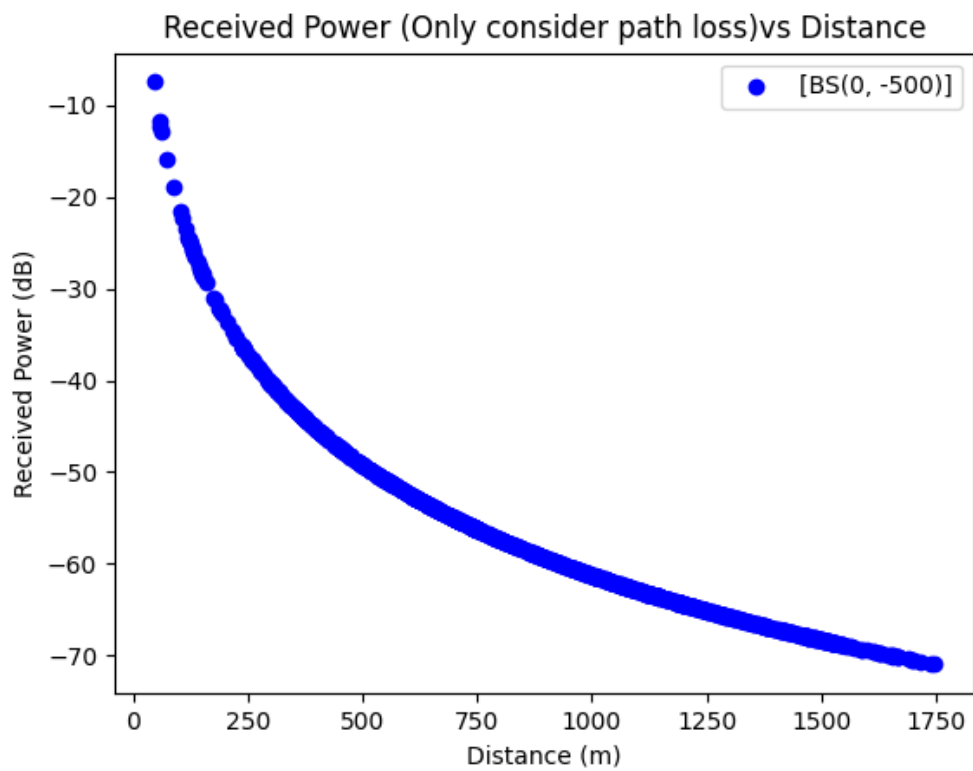


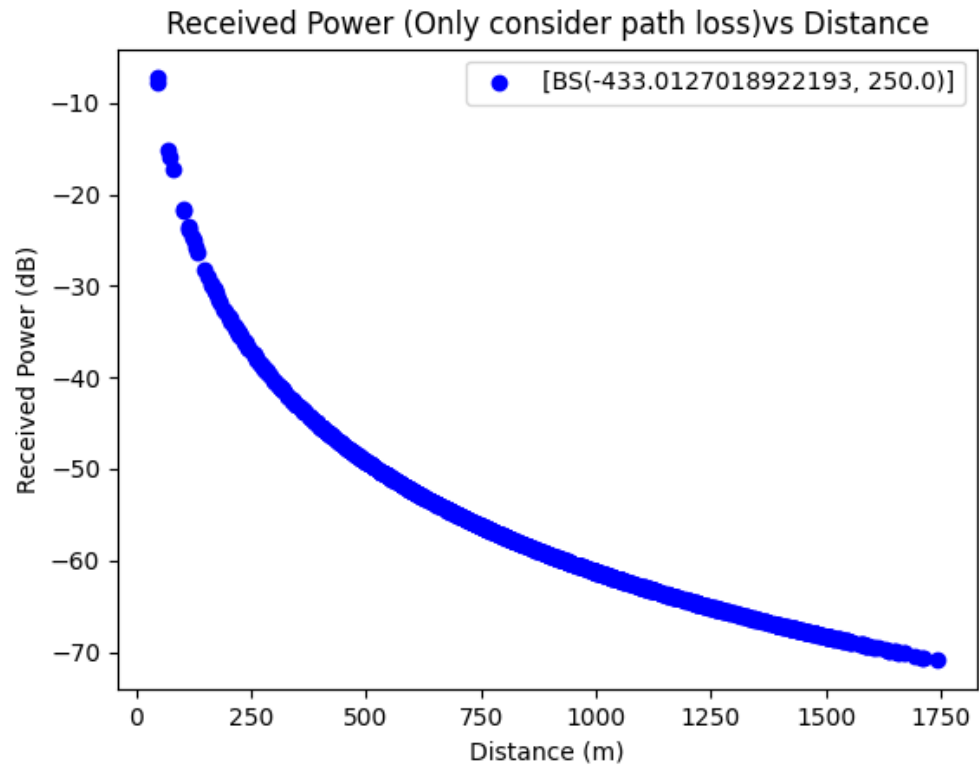
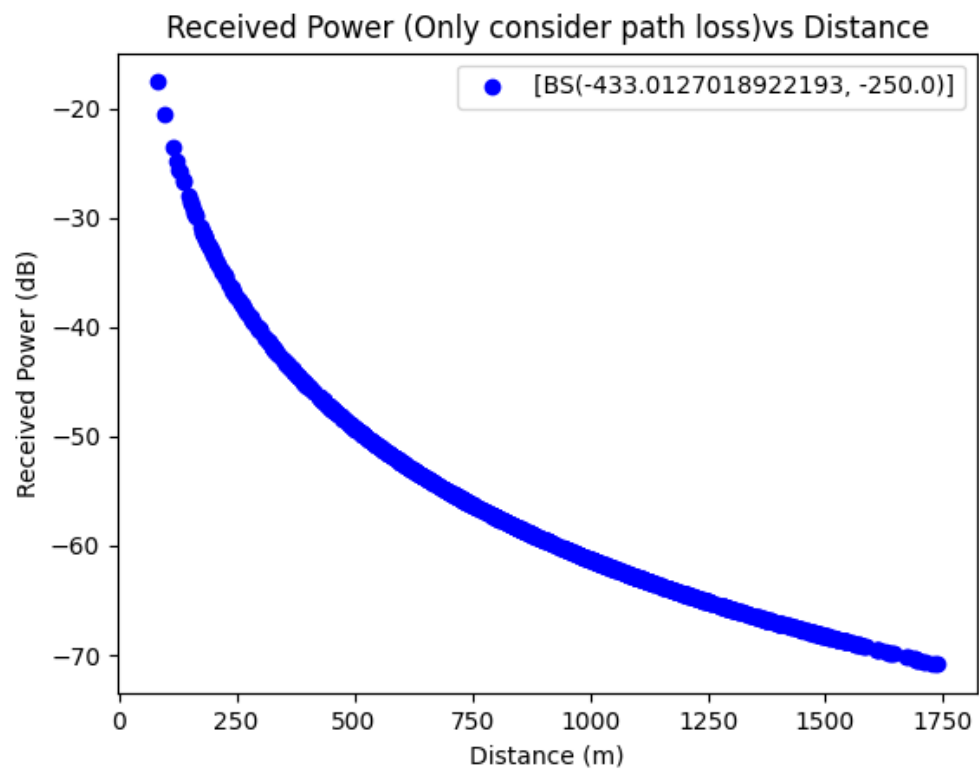
Bonus 2

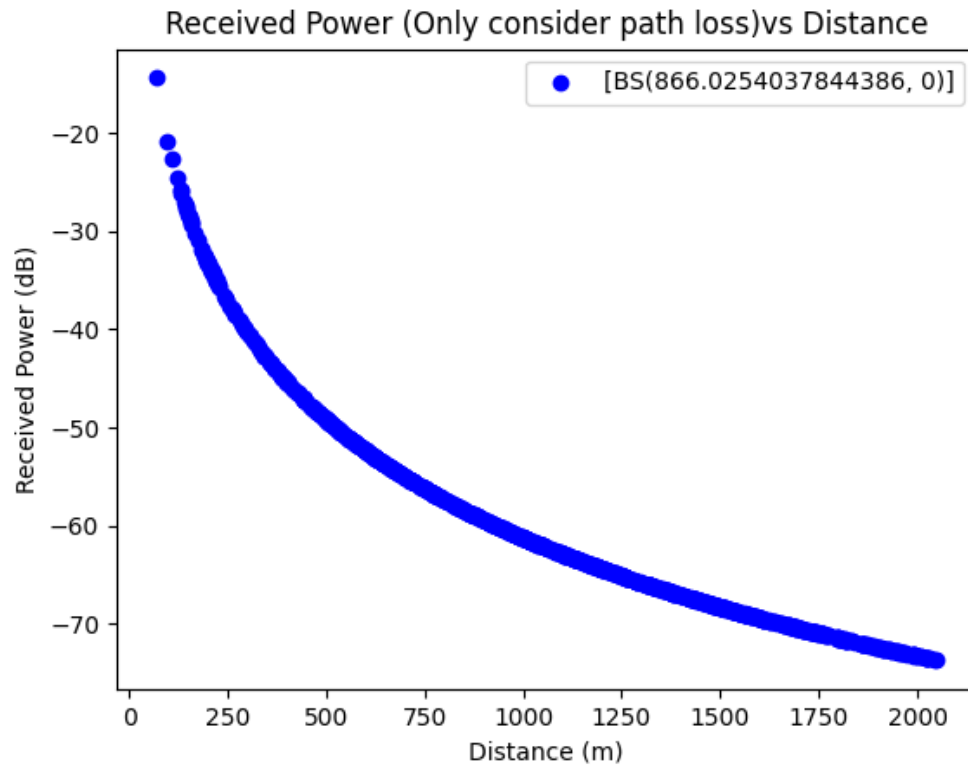
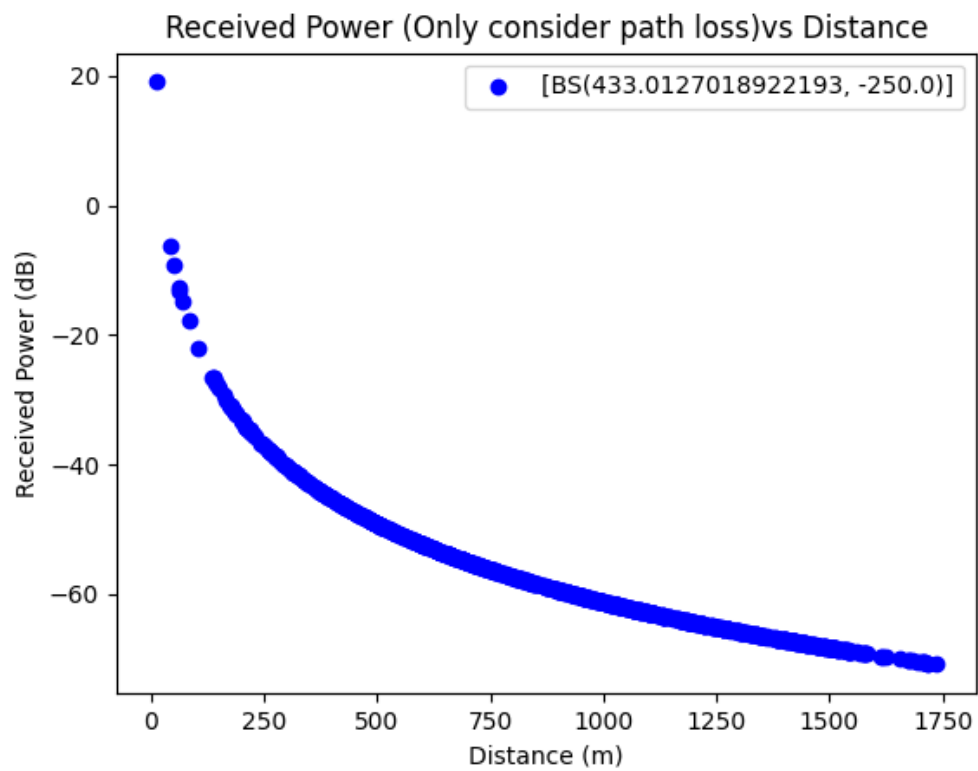
類似 2-2 只是點的數量變為 950 個，再轉成 dB

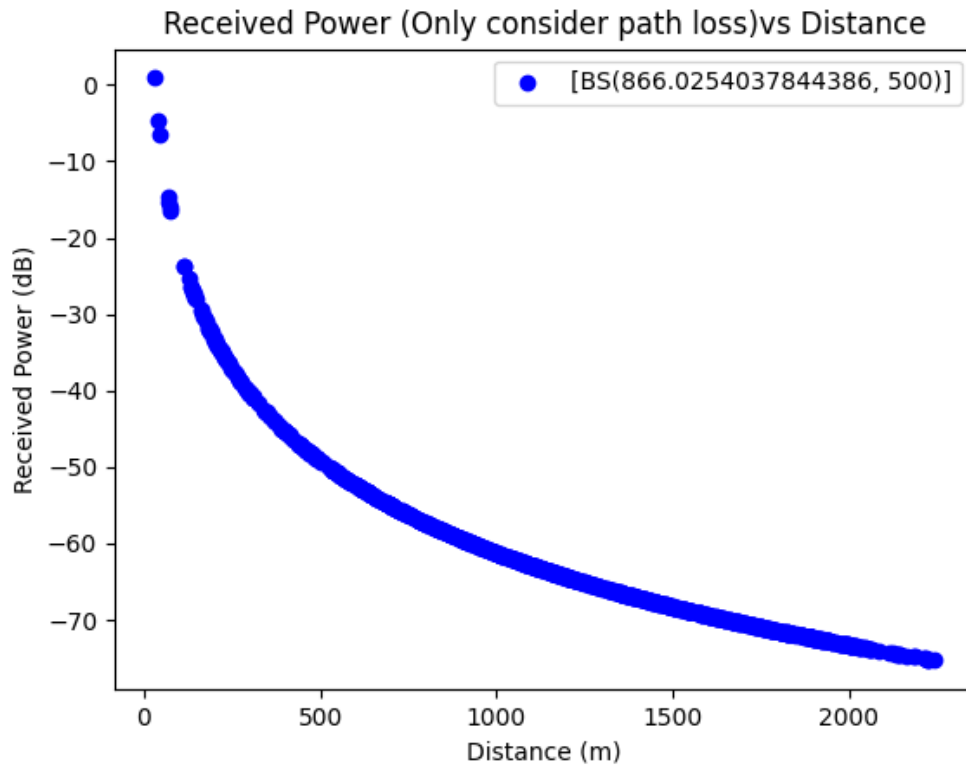
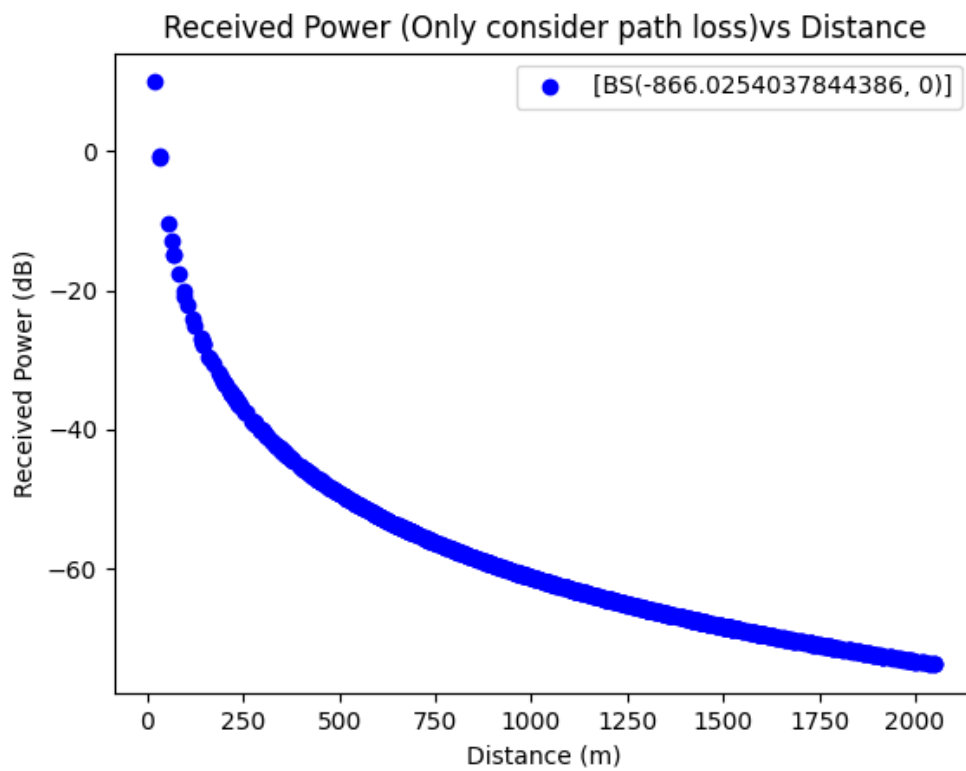
$10 * \text{np.log10}(P_m * (G_t * G_r * (h_{bs}^{**2}) * (h_{md}^{**2})) / (d^{**4}))$

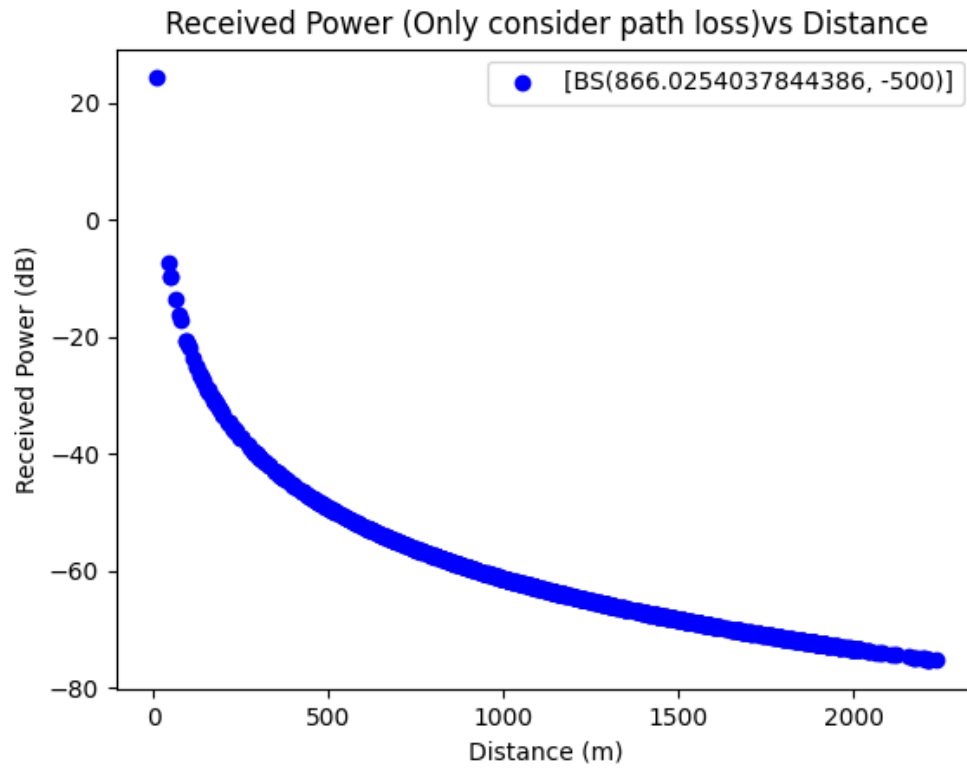
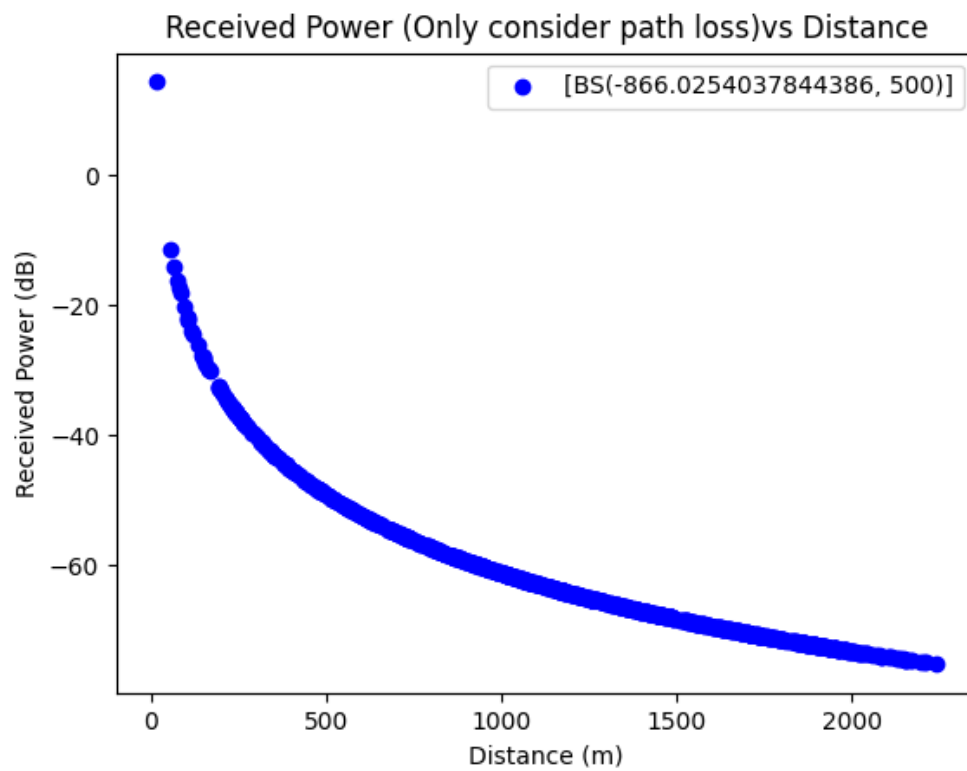


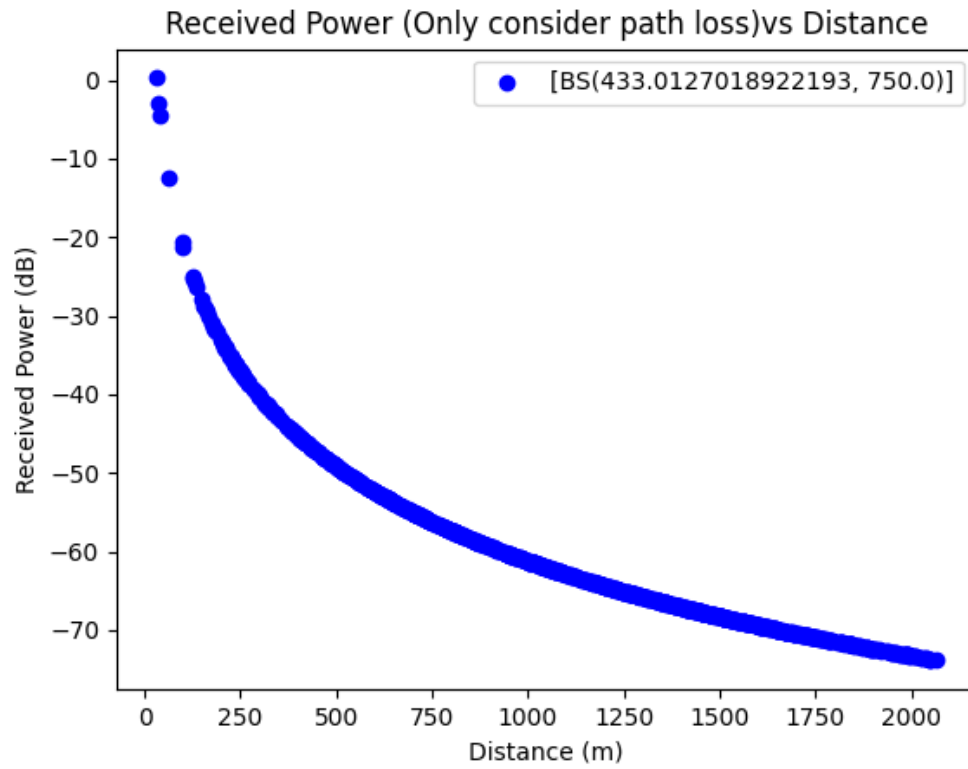
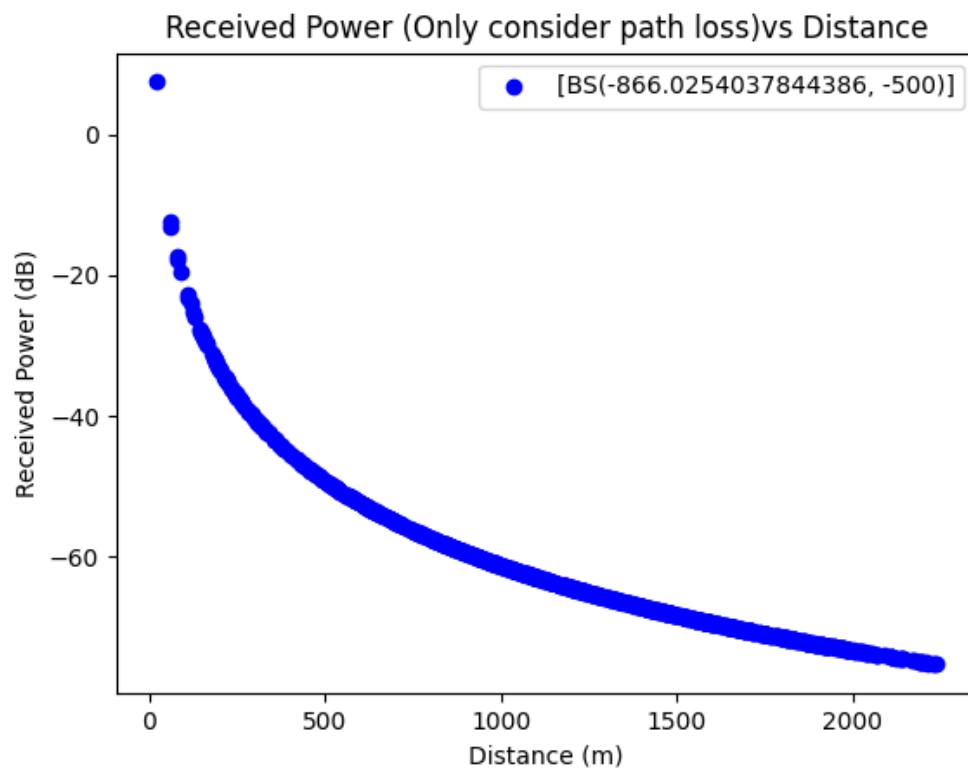


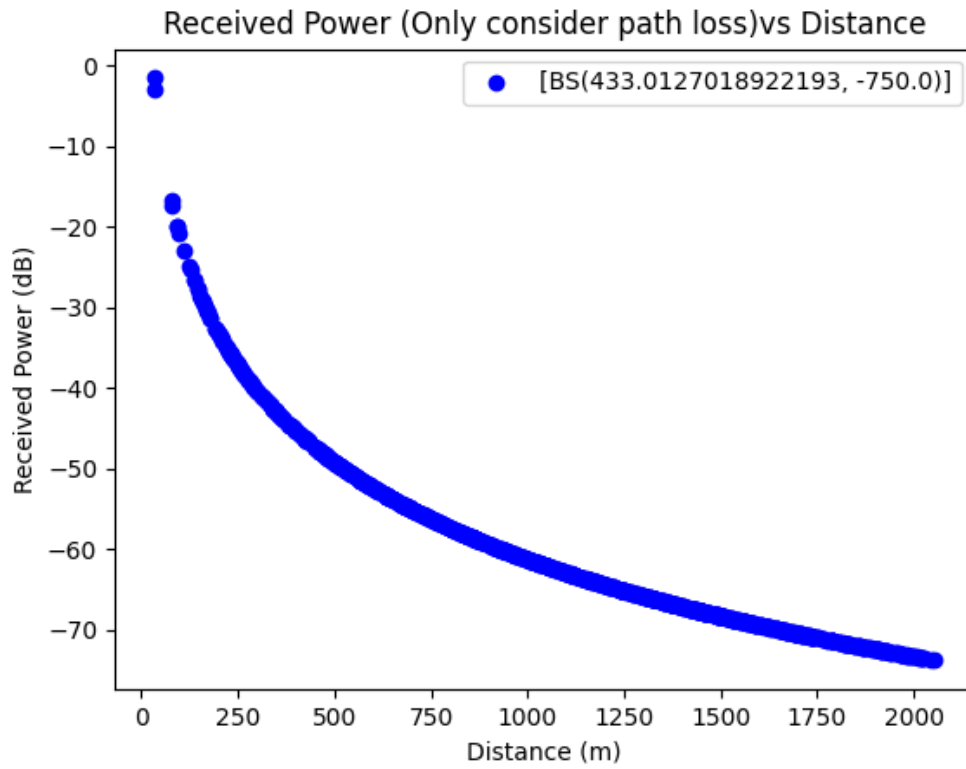
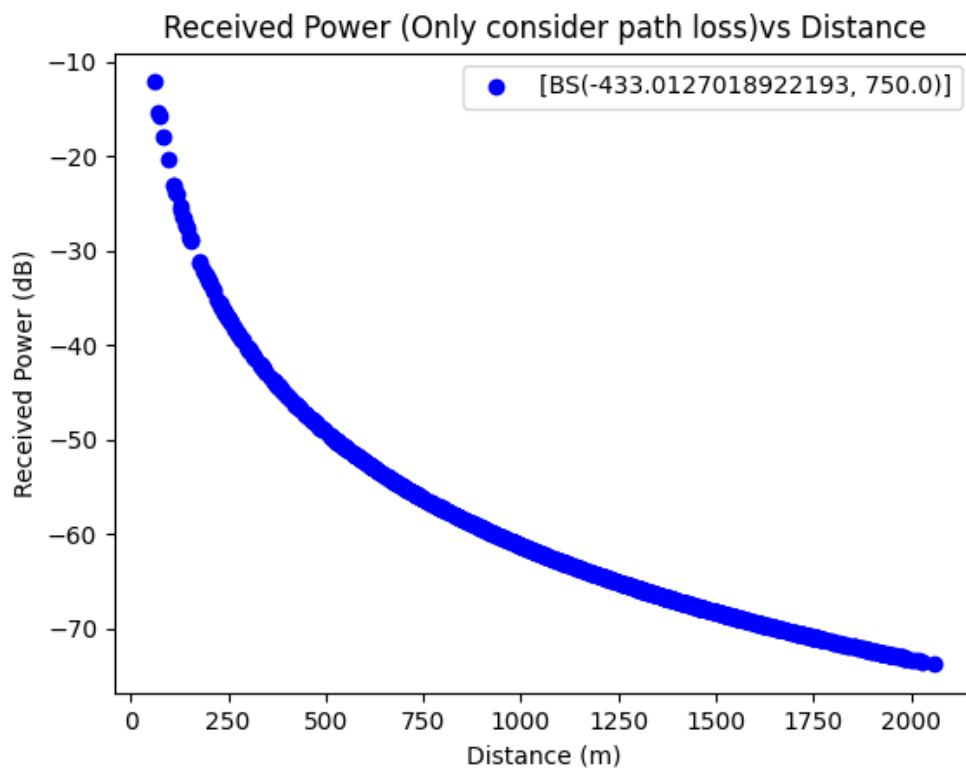


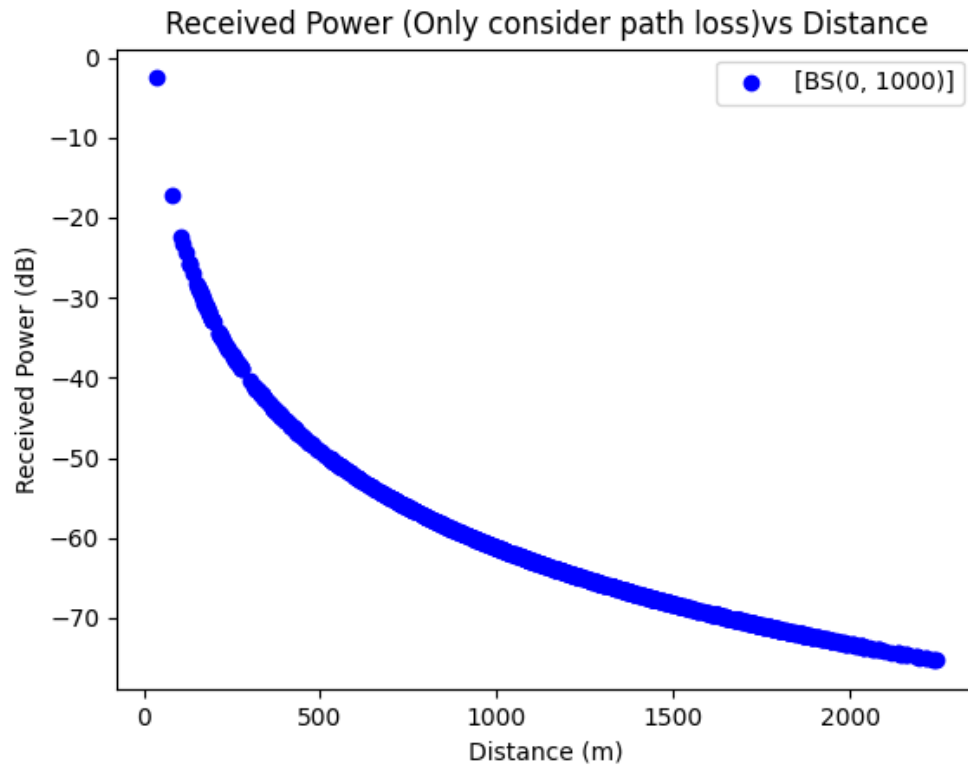
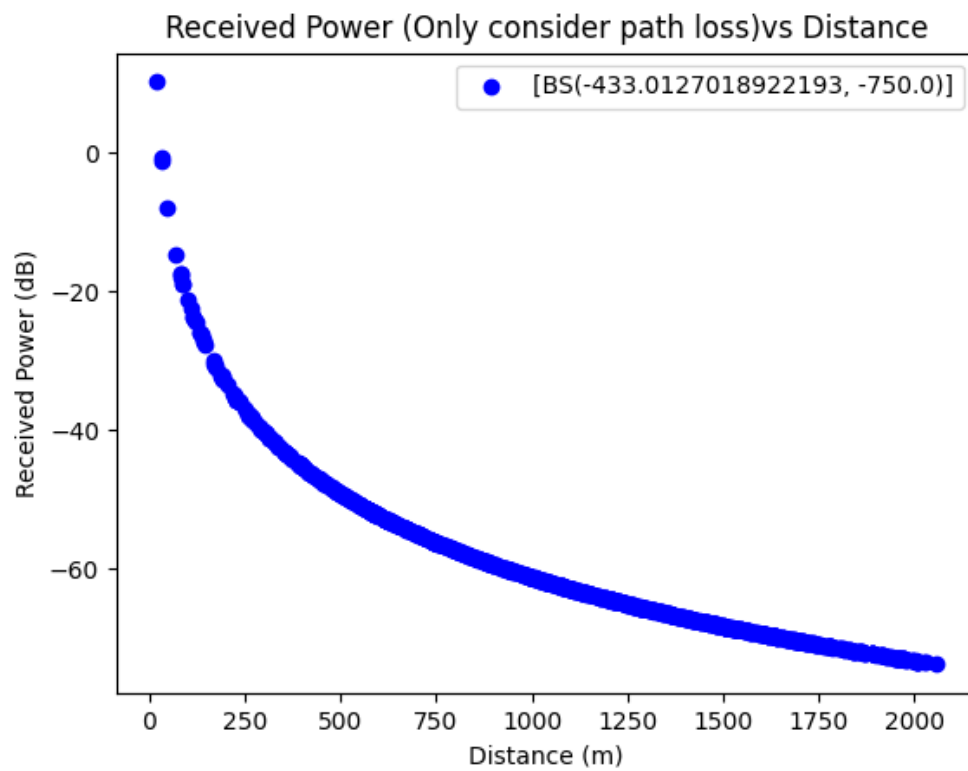


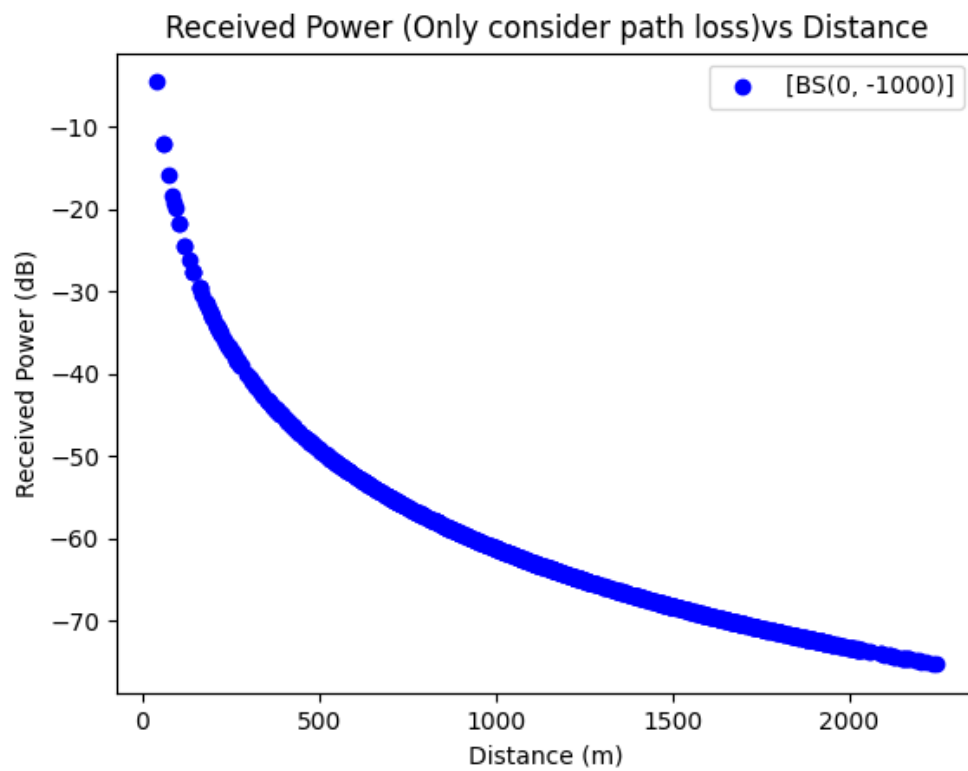












Bonus3

同樣類似 2-3 只是 interference 等於其他 949 個點傳給 BS 的能量相加，再加上 thermal noise
而 P_{received} 則不變

