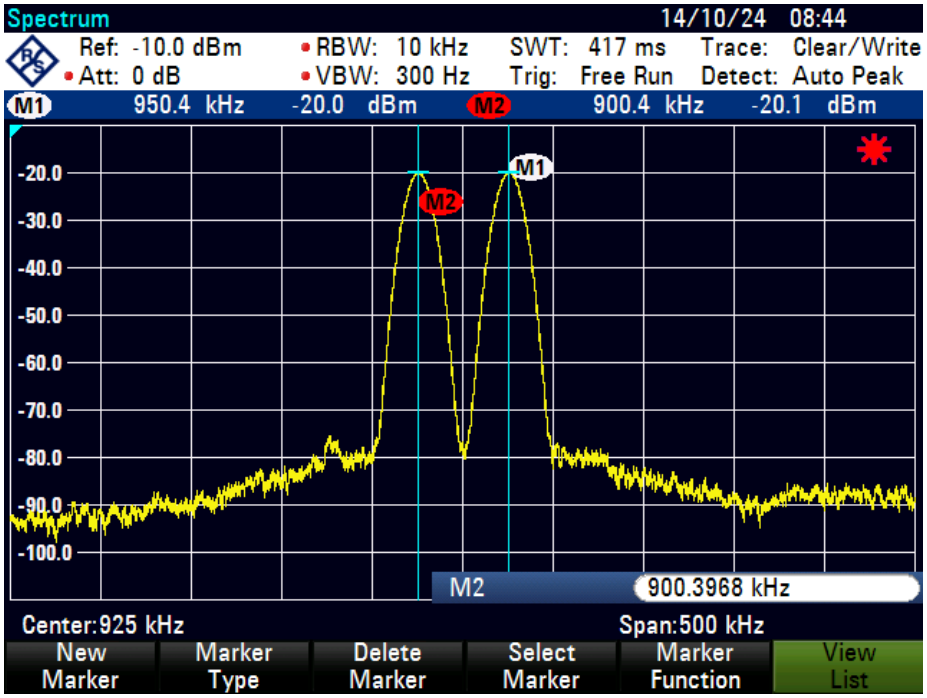
P2 ICOM - Pere Sánchez i Aitor Pitarch

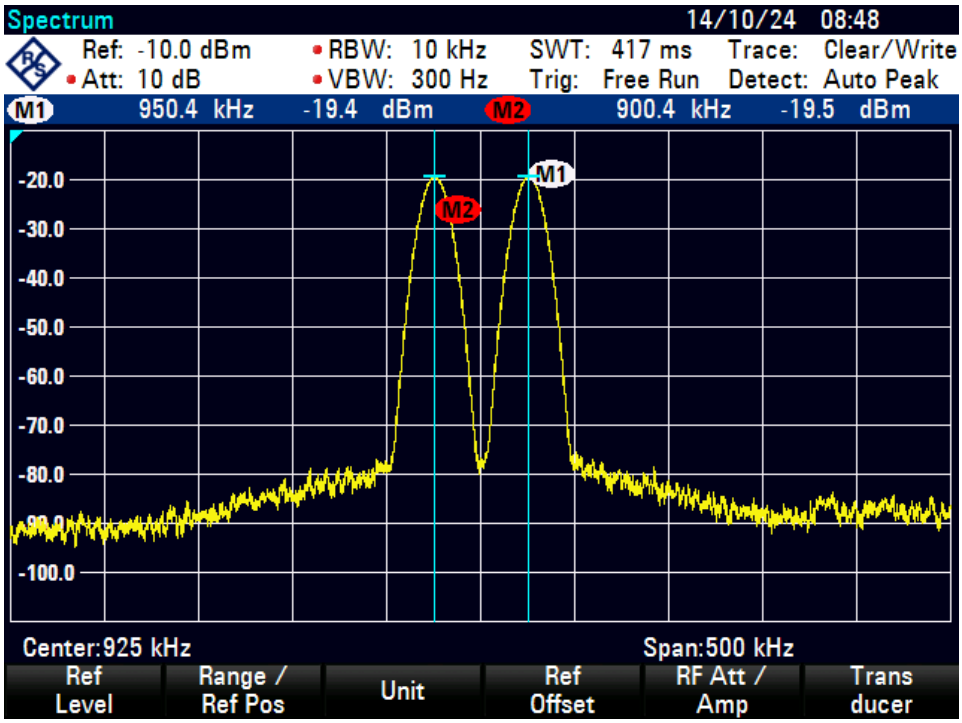
2.1

Nivell de soroll: P_N= -108,5 dBm
Amb SNR de 30dBm, P_S = P_N + 30dBm = -108,5 + 30 = -78,5 dBm

2.2:



Ajustem els paràmetres per tal que s'observin els dos senyals a -20dBm.



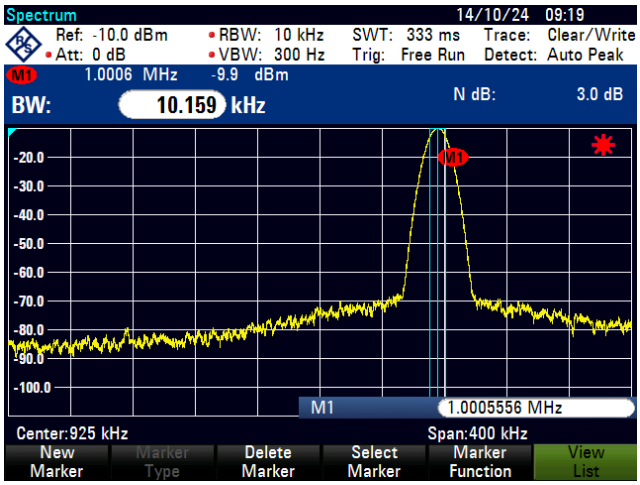
Variem l'atenuació i veiem que la potència del senyal no varia, per tant no estem en saturació.

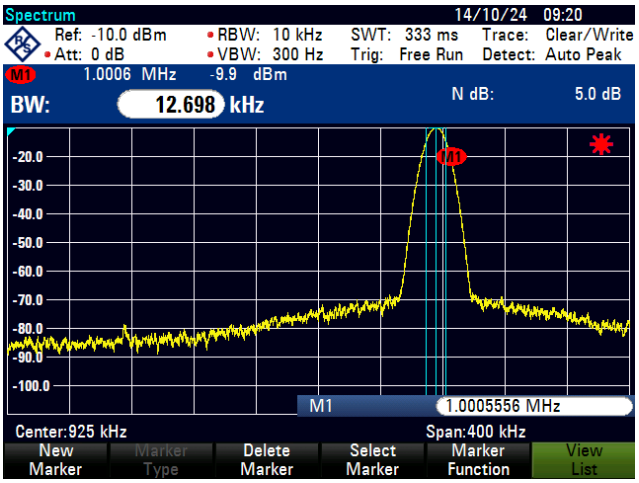
TOI:

Delta = 62,1 dB P_i = -20,1 dBm

TOI = -20,1 dBm + 62,1 / 2 = 10,95 dBm.

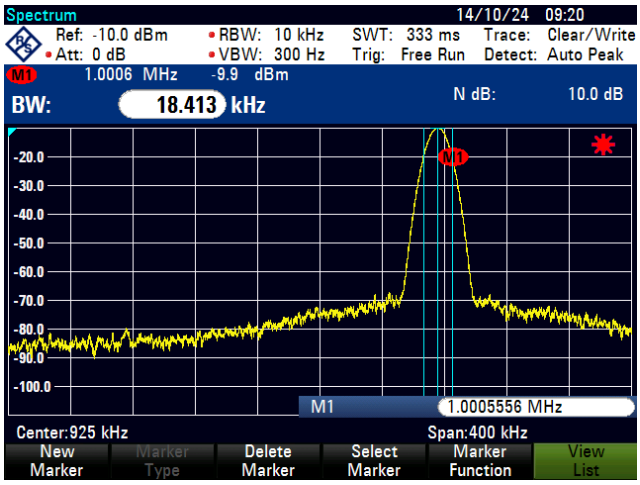
2.3: BW en diferents dB respecte -10dB

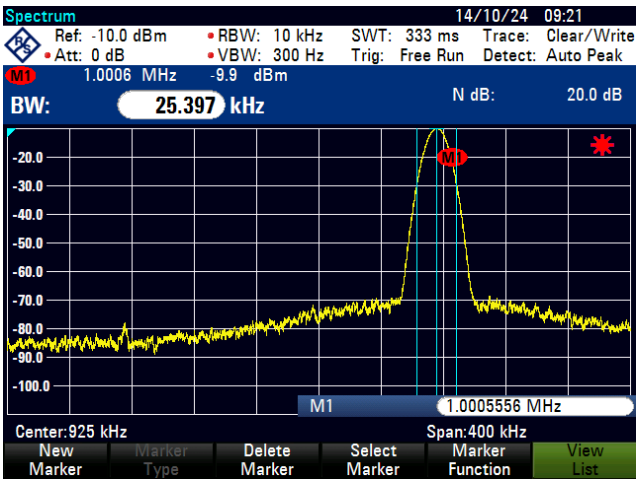




-3dB: Bw = 10.159 kHz

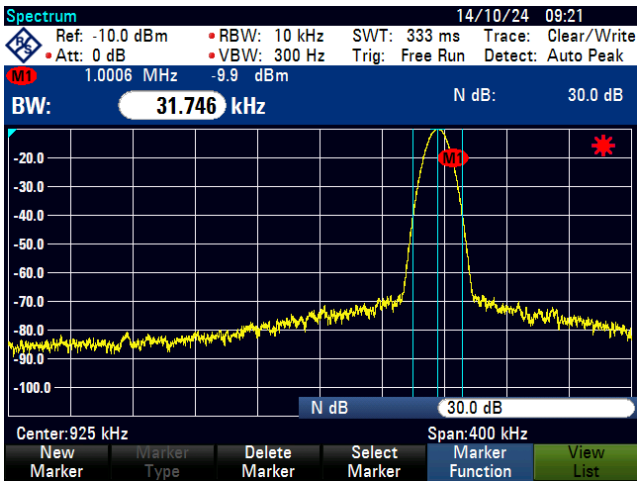
-5d: Bw = 12.698 kHz



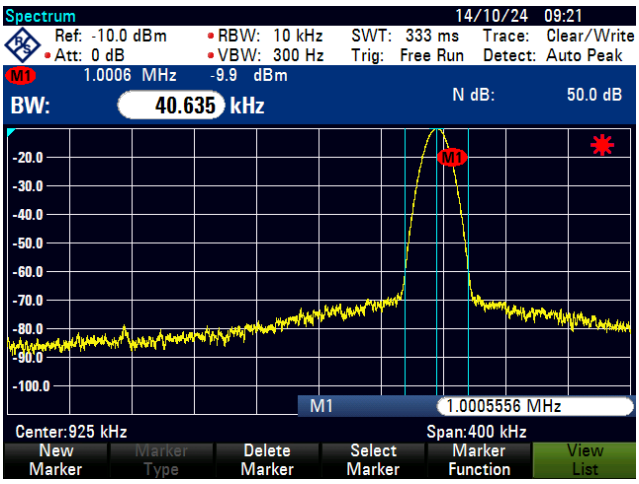


-10dB: Bw = 18.413 kHz

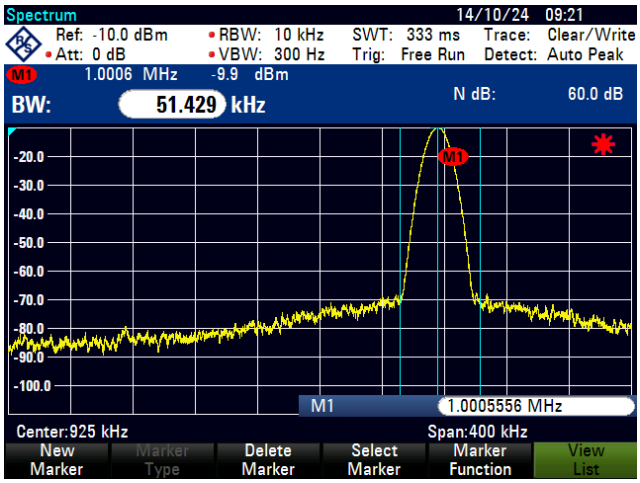
-20dB: Bw = 25.397 kHz



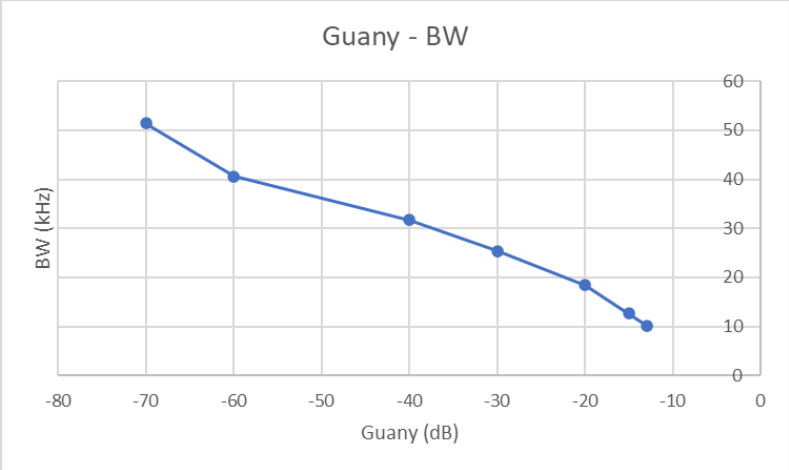
-30dB: Bw = 31.746 kHz



-50B: Bw = 40.635 kHz



-60dB: Bw = 51.429 kHz

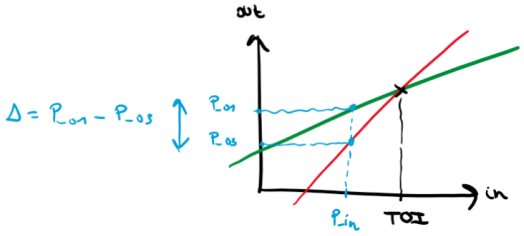


Selectivitat del receptor: $S = BW_{60dBm} / BW_{3dBm} = 51.429\,kHz / 10.159\,kHz = 5.062$

Estudi previ

$P_{in} = P_{o1}$

$P_{out} = P_{o3}$



↳ $P_{o3} = K \cdot P_{in}^3 \rightsquigarrow P_{o3}(dBm) = 10 \cdot \log_{10}(K \cdot P_{in}^3) = 3 \cdot P_{in}(dBm) + K(dBm)$

$TOI \rightarrow P_{o3} = P_{o1} \longrightarrow 3 \cdot P_{in} + K = P_{in}$

$K = -2 \cdot TOI.$

$\Delta = P_{o1} - P_{o3} = P_{in} - (3 \cdot P_{in} + \underbrace{K}_{-2 \cdot TOI}) = P_{in} - 3P_{in} + 2 \cdot TOI$

↳ $\Delta = 2 \cdot TOI - 2 \cdot P_{in} \rightarrow \Delta/2 = TOI - P_{in}$

$$\boxed{TOI = P_{in} + \Delta/2}$$