```
syms R;       % Maximum Range, meters

% constants
k = physconst('Boltzmann');     % Boltzmann's constant = 1.38 x 10^-23 Joules/Kelvin
c = physconst('Lightspeed');    % Lightspeed
T = 296.15;                     % antenna temperature, in Kelvin, that's 23°C

% parameters set by myself
f = 64e9;       % frequency, Hz = 1/s
rcs = 0.5;      % Radar Cross Section, meter^2, child
snr_dB = 15;    % Minimum signal-to-noise ratio, dB
snr = 10^(snr_dB/10);

% according to data sheet of IWR6843AoP
EIRP_dBm = 15;      % Effective isotrophic radiated power, in dBm
EIRP_dBW = EIRP_dBm - 30;
P_t = (10^(EIRP_dBW/10))*3; % output power of device (with 3 transmitter) in Watts

EINF_dB = 14;       % Effective isotropic noise figure, in dB
EINF = 10^(EINF_dB/10);

G_dBi = 7.5;        % Transmit antenna gain at 0° from radiation pattern, in dBi
G = 10^(G_dBi/10);

% calculate wavelength
l  = c/f; % wavelength, millimeter

% according to TI calculator (https://dev.ti.com/gallery/view/1792614/mmWaveSensingEstimator/ve
T_meas = 0.1;           % frame periodicity, in s

% solve radar equation from TI
eqn = snr == (rcs*P_t*G^2*l^2*T_meas)/(((4*pi)^3)*(R^4)*k*T*EINF);
range = solve(eqn, R, 'Real',true);
round(range)
```

```
ans =
```

$$\begin{pmatrix} 150 \\ -150 \end{pmatrix}$$

```
% according to calculator it's 71.11m
```