Environmental evaluation and exposure limit according to FCC CFR 47part 1, §1.1307, §1.1310

To confirm compliance with a safe distance for base station unit the following calculation was done:

Limit for power density for general population/uncontrolled exposure is 1 mW/cm^2 for 1500 -100000 MHz frequency range:

The power density **$P\ (mW/cm^2) = P_T / 4\pi r^2$**, where

P_T is the transmitted power, which is equal to the peak transmitter output power plus maximum antenna gain.
Our approach for output power and EIRP calculations for systems utilizing the Smart Antenna System (SAS):

1. The output power was summed across channels within the band - a device can transmit simultaneously on the same or different channels. Signal combiners should be avoided because it can produce anomalous results if the summed signals exhibit any correlation. The measured output power per chain shall be summed in linear units and converted back into decibels. Alternatively
   Output power=Tx power per chain+10log(# of Tx chains), however this option is less preferred.
2. All modes that drive multiple antenna elements with coherent signal, including legacy modes for communicating with non-MIMO devices
   Directional gain = gain of antenna element + 10 log(# of TX antenna elements)
3. 10 log(# of TX chains) in item 1 above represents power sum across RF spectrum and all Tx chains and 10 log(# of TX antenna elements) in item 2 represents the beamforming gain of antenna
4. Based on the above the total EIRP shall be calculated as follows:
   EIRP= Total power + Directional gain
   EIRP=Tx power per chain+10log(# of Tx chains)+gain of antenna+10log(# of ant elements)
   For our case the max value is:
   EIRP= 30.55 dBm + 6 dBi + 7.8 dB = 44.33 dBm, which is equal to 27102 mW.

The minimum safe distance “r”, where RF exposure does not exceed FCC permissible limit, is

$$r = \text{sqrt}\ \{ P_T / (P \times 4\pi)\} = \text{sqrt}\ \{27101 / 12.56\} = 46\ \text{cm} << 2\ \text{m}\ .$$

General public cannot be exposed to dangerous RF level.