RF Exposure calculations

EUT : BT3030
FCC ID : D6XBT3030
Antenna Gain : 1 dBi

From ♣FCC 1.1310 table 1A, the maximum permissible RF exposure for an uncontrolled environment is 1mW/(cm*cm), where, (cm*cm) = square cm.
The electric field generated for a 1mW/(cm*cm) exposure (S) is calculated as follows:

$S = E*E/Z$

where, S = Power density
E = Electric field
Z = Impedance
so, 1mW/(cm*cm) = 10 W/(m*m)

Z is 377 ohm of the impedance of free space, where E and H field are perpendicular.
Thus the Electric field to produce a 1mW/(cm*cm) exposure is:
$E = (10 \times 377)^{1/2}$ = 61.4 V/m, which is equivalent to 1mW/(cm*cm)

Maximum conducted peak output power is 11.93 dBm, and maximum antenna gain is 1 dBi. The maximum radiated output power resulted in 19.63 mW.

Using the relationship between electric field E, effective radiated power in watts P, and distance in meters D, the corresponding distance D to produce a 1mW/(cm*cm) is calculated in the following expression:

$D = (P \times 30)^{1/2} / E = (19.63 \times 10 \times 30)^{1/2} / 61.4 = 1.25$ cm
where, P: maximum effective radiated power measured, 12.93 dBm (19.63mW)
E: electric field equivalent to 1mW/(cm*cm), 61.4 V/m

Notice in Installation Manual:
While installing and operating this transmitter, the radio frequency exposure limit of 1mW/(cm*cm) may be exceeded at distances close to the transmitter. therefore, the user must maintain a minimum distance of 20 cm from the device at all time.

The table below identifies the distance where the 1mW/(cm*cm) exposure limits may be exceeded during continuous transmission using this device.

Peak output power		calculated RF Exposure Separation Distance(cm)	Minimum RF Exposure Separation Distance(cm)
dBm	mW	1.25	20
11.93	15.59		