RF Exposure Compliance Requirement

1. Standard requirement

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radia frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

(a) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $\lvert E \rvert^2$, $\lvert H \rvert^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $\lvert E \rvert^2$, $\lvert H \rvert^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/500	30
1500-100000			1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

2. MPE Calculation Method

$S\ (mW/cm^2) = P*G/4Pi*R^2$

S = Power Density (mW/cm^2)

P = Peak RF conducted output Power (mW)

G = EUT Antenna numeric gain (numeric)

R = Separation distance between radiator and human body (cm);

$R = \sqrt{(P*G)/4Pi*S}$

From the maximum EUT RF output power, as well as the gain of the used antenna, according to the RF power density limit above, the minimum distance between the antenna and human body will be calculated.

3. Calculated Result

3.1 For downlink: 450MHz to 509MHz

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm^2)	Minimum Distance to human body (cm)
For C4FM mode						
450.00625	12.5	17.8	35.9	3890.451	1.500	60.627
481	12.5	17.8	35.4	3467.369	1.603	55.361
508.99735	12.5	17.8	35.7	3715.352	1.697	55.708
For FM(6.25k) mode						
450.003125	12.5	17.8	35.9	3890.451	1.500	60.627
481	12.5	17.8	35.4	3467.369	1.603	55.361
508.996875	12.5	17.8	35.6	3630.781	1.697	55.070
For FM(12.5k) mode						
450.00625	12.5	17.8	35.9	3890.451	1.500	60.627
481	12.5	17.8	35.4	3467.369	1.603	55.361
508.99375	12.5	17.8	35.6	3630.781	1.697	55.071
For FM(25k) mode						
450.0125	12.5	17.8	35.9	3890.451	1.500	60.627
481	12.5	17.8	35.4	3467.369	1.603	55.361
508.9875	12.5	17.8	35.6	3630.781	1.697	55.071

3.2 For uplink: 455MHz to 512MHz

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm^2)	Minimum Distance to human body (cm)
For C4FM mode						
455.00625	12.5	17.8	27.5	562.341	1.517	22.923
484	12.5	17.8	27.2	524.808	1.613	21.471
511.99735	12.5	17.8	27.3	537.032	1.707	21.117
For FM(6.25k) mode						
455.003125	12.5	17.8	27.4	549.541	1.517	22.660
484	12.5	17.8	27.4	549.541	1.613	21.971
511.996875	12.5	17.8	27.2	524.808	1.707	20.876
For FM(12.5k) mode						
455.00625	12.5	17.8	27.5	562.341	1.517	22.923
484	12.5	17.8	27.2	524.808	1.613	21.471
511.99375	12.5	17.8	27.3	537.032	1.707	21.118
For FM(25k) mode						
455.0125	12.5	17.8	27.5	562.341	1.517	22.923
484	12.5	17.8	27.2	524.808	1.613	21.471
511.9875	12.5	17.8	27.3	537.032	1.707	21.118

Conclusion:

So the recommend use distance away from EUT external antenna is larger than 60.627 centimeter(cm).