FCC §1.1307& §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

(B) Limits for General Population/Uncontrolled Exposure						
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)		
0.3-1.34	614	1.63	*(100)	30		
1.34-30	824/f	2.19/f	*(180/f ²)	30		
30-300	27.5	0.073	0.2	30		
300-1500	/	/	f/1500	30		
1500-100,000	/	/	1.0	30		

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

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

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

 $S = PG/4 \pi R^2 =$ power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Mode	Max Turn-up power (dBm)	ERP/EIRP Limit (dBm)	Max Antenna Gain (dBi)
WCDMA (Band V)	24.0	38.45	14.45
WCDMA (Band II)	23.5	33	9.5
FDD (Band 2)	23.0	33	10
FDD (Band 4)	23.0	30	7
FDD (Band 5)	23.0	38.45	15.45
FDD (Band 13)	22.0	34.77	12.77
FDD (Band 17)	22.0	34.77	12.77

Mode	Frequency	Antenna Gain		Target Output Power		Evaluation Distance	Power Density	MPE Limit
	(MHz)	(dBi)	(numeric)	(dBm)	(mW)	(cm)	(mW/cm ²)	(mW/cm ²)
WCDMA (Band V)	826.4	10.42	11.03	24.0	251.19	20	0.551	0.551
WCDMA (Band II)	1880.0	13.52	22.46	23.5	223.87	20	1.000	1.000
FDD (Band 2)	1880.0	14.01	25.19	23.0	199.53	20	1.000	1.000
FDD (Band 4)	1732.5	14.01	25.19	23.0	199.53	20	1.000	1.000
FDD (Band 5)	836.5	11.48	14.05	23.0	199.53	20	0.558	0.558
FDD (Band 13)	782.0	12.18	16.53	22.0	158.49	20	0.521	0.521
FDD (Band 17)	710.0	11.77	15.01	22.0	158.49	20	0.473	0.473

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Mode	Max Allow Antenna Gain (dBi)	
WCDMA (Band V) Uplink Frequency: 826.4 MHz~846.6 MHz	10.42	
WCDMA (Band II) Uplink Frequency: 1852.4 MHz~1907.6 MHz	9.5	
FDD (Band 2) Uplink Frequency: 1850 MHz~1910 MHz	10	
FDD (Band 4) Uplink Frequency: 1710 MHz~1755 MHz	7	
FDD (Band 5) Uplink Frequency: 824 MHz~849MHz	11.48	
FDD (Band 13) Uplink Frequency: 777 MHz~787 MHz	12.18	
FDD (Band 17) Uplink Frequency: 704 MHz~716 MHz	11.77	

Note :

For the above target output power are all declared by the manufacturer.

To meet RF exposure & ERP/EIRP, the maximum net gain of antennas allowed are 10.42 dBi @ B5, 9.5 dBi @ B2, 7 dBi @ B4, 12.18 dBi @ B13, and 11.77 dBi @ B17.