

FCC§1.1307(b)(1) & §2.1091-RF EXPOSURE

1. Applicable Standard

According to FCC§part 1.1310 and §Part 2.1091 (Mobile Devices) RF exposure is calculated.

Frequency Range(MHz)	Electric Field Stength(V/m)	Magnetic Field Stength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
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

f=frequency in MHz

*=Plane-wave equivalent power density

2. Prediction of MPE limit at given distance, equations from OET Bulletin 65, Edition 97-01:

$$S = (1.64 * P * G) / (4 * \pi * R^2) \quad (\text{where } PG = \text{ERP})$$

$$S = (P * G) / (4 * \pi * R^2) \quad (\text{where } PG = \text{EIRP})$$

Where:

S = power density

P= power input to antenna

G= numeric gain of the antenna

R= distance to the center of radiation of the antenna

a 700MHz Lower ABC Band (Downlink 728~746MHz):

Maximum peak output power at antenna input terminal (dBm): 31.55

Maximum peak output power at antenna input terminal (mW): 1429

Prediction frequency (MHz): 739.3

Maximum antenna gain (dBi): 12.5

Maximum antenna gain (dBd): 10.35

Maximum antenna gain (numeric): 10.84

Maximum RF output power (ERP, mW): 15489

MPE limit for uncontrolled exposure at predication frequency (mW/ cm²): 0.493

$$\text{Prediction distance (cm) } R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}} : 64$$

b 700MHz Upper C Band (Downlink 746~757MHz):

Maximum peak output power at antenna input terminal (dBm):	30.75
Maximum peak output power at antenna input terminal (mW):	1188
Prediction frequency (MHz):	751.5
Maximum antenna gain (dBi):	12.5
Maximum antenna gain (dBd):	10.35
Maximum antenna gain (numeric):	10.84
Maximum RF output power (ERP, mW):	12883
MPE limit for uncontrolled exposure at predication frequency (mW/ cm ²):	0.501
Prediction distance (cm) $R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}}$:	57.94

c 850MHz Band (Downlink 869~894MHz):

Maximum peak output power at antenna input terminal (dBm):	31.01
Maximum peak output power at antenna input terminal (mW):	1261.8
Prediction frequency (MHz):	881.5
Maximum antenna gain (dBi):	12.5
Maximum antenna gain (dBd):	10.35
Maximum antenna gain (numeric):	10.84
Maximum RF output power (ERP, mW):	13677.9
MPE limit for uncontrolled exposure at predication frequency (mW/ cm ²):	0.588
Prediction distance (cm) $R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}}$:	55.11

d 1900MHz Broadband PCS (Downlink 1930~1995MHz):

Maximum peak output power at antenna input terminal (dBm):	30.80
Maximum peak output power at antenna input terminal (mW):	1202.2
Prediction frequency (MHz):	1985
Maximum antenna gain (dBi):	12.5
Maximum antenna gain (dBd):	10.35
Maximum antenna gain (numeric):	10.84
Maximum RF output power (ERP, mW):	13032.5
MPE limit for uncontrolled exposure at predication frequency (mW/ cm ²):	1
Prediction distance (cm) $R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}}$:	41.25

e AWS-1 Band (Downlink 2110~2155MHz):

Maximum peak output power at antenna input terminal (dBm):	30.43
Maximum peak output power at antenna input terminal (mW):	1104.1
Prediction frequency (MHz):	2112.5
Maximum antenna gain (dBi):	12.5
Maximum antenna gain (dBd):	10.35
Maximum antenna gain (numeric):	10.84
Maximum RF output power (ERP, mW):	11968.2
MPE limit for uncontrolled exposure at predication frequency (mW/ cm²):	1
Prediction distance (cm) $R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}}$:	39.53

3. Test Results

The above all, when the Maximum antenna gain is 12.5dBi and the shortest distance from the human Specific is 64cm, then the device is compliant with the requirement MPE limit for uncontrolled exposure.