RF Exposure (SAR)

Test Date	Sep. 03, 2009
Sample Number	764994
Tested By	Jeremy LEE

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/CABC0308

Test Limits

FCC15.247 (i)

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 levels in excess of the Commission's guidelines. *See* § 1.1307(b)(1) of this chapter.

FCC1.1310

The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in § 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of § 2.1093 of this chapter. Further information on evaluating compliance with these limits can be found in the FCC's OST/OET Bulletin Number 65, ''Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation.''

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f^2)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) 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

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Included are calculations that determine that minimum distance from the transmitter antenna that will ensure an exposure limit at or below the guidelines given in Table 1 of Section 1.1310 for the general population. The formula for these calculations are taken from OET Bulletin 65, edition 97-01, August 1997; "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields".

Calculations

Per Table 1 of Section 1.1310, the limit for General Population/Uncontrolled Exposure at 902 to 928MHz is f/1500 mW/cm^2, where f is frequency in MHz.
Per OET Bulletin 65, Edition 97-01, the formula for calculating power density is: $S=P*G/4\pi d^2$ with:

Given
E=√(30*P*G)/d
and
S=E^2/3770
where
E=Field Strength in Volts/meter
P=Power in Watts
G=Numeric antenna gain
D=Distance in meters
S=Power Density in milliwatts/square centimeter

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields:
d=√ ((30*P*G)/(3770*S)

Changing to units of Power to mW and Distance to cm, using:
P(mW)=P(W)/1000 and
D(cm)=100*d(m)

yields
d=100*√30*(P/1000)*G)/(3770*S))
d=0.282*√(P*G/S)

where
d=distance in cm
P=Power in mW
G=Numeric antenna gain
S=Power Density in mW/cm^2

Substituting the logarithmic form of power and gain using:
P(mW)=10^(P(dBm)/10) and
G(numeric)=10^(G(dBi)/10)

yields
d=0.282*10^((P+G)/20)/ √S Equation(1)

where
d=MPE distance in cm
P=Power in dBm
G=Antenna Gain in dBi
S=Power Density Limit in mW/cm^2

Equation (1) and the measured peak power is used to calculate the MPE distance.

Limits

From §1.1310 Table 1 (B), S=1.0mW/cm^2

Results

No non-compliance noted:

Channel Frequency(MHz)	Power Density Limit (mW/cm^2)	Output Power (dBm)	Gain of Antenna (dBi)	MPE distance (cm)
902.60	0.60	+11.30	0	1.337
915.00	0.61	+9.30	0	1.053
927.40	0.62	+11.15	0	1.285

Conclusion

For mobile or fixed location transmitters, the minimum separation distance is 20cm, even if calculations indicate that the MPE distance would be less. Therefore, the minimum safe distance has to be inserted in the EUT's User Manual.