RF EXPOSURE INFORMATION

1. MPE Limits

The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1
According to FCC §1.1310 : the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency(RF) radiation as specified in §1.1307(b).

Table1. Limits for Maximum Permissible Emission

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits For Occupational / Control Exposures (f= frequency)				
30-300	61.4	0.163	1.0	6
300-1500	…	…	…	6
1500-100,000	…	…	…	6
(B) Limits For General Population / Uncontrolled Exposure (f=frequency)				
30-300	27.5	0.073	0.2	30
300-1500	…	…	f/1500	30
1500-100,000	…	…	1.0	30

EUT information

Type of equipment : GSM/GPRS/EDGE module
Model Name : MGM-312E
FCC ID : A7XMGM-312E
Tx Frequency Band : 824.2 ~ 848.8 MHz (GSM850)
1850.2 ~ 1909.8 MHz(GMS1900)
GPRS Multi-slot class : 12

Procedure

The procedure used to determine the RF power density was based upon a calculation for determining compliance with the MPE requirements.

The power generated by each transmitter used in this was initially measured as a ERP (EIRP). The power density level is calculated at a distance of 20 cm. And Minimum distance is also calculated.

MPE calculations are calculated under Maximum Power condition in each band.

Formula

P_d =(ERP) / (4π r^2)

Where,

P_d= Power Density (mW/cm^2)

π=3.1416

r=distance between observation point and centre of the radiator(cm)

Calculated MPE

The power density limit for General Population/Uncontrolled Exposure at each frequency is determined based on the information in Table 1. MPE calculations are calculated under Maximum Power condition in each band.

Table 2. Source based output power

Frequency (MHz)	Output Power		Mode	Duty Cycle	Source Based output power(W)
	dBm	W			
850	31.17	1.309	GSM/GPRS	12.5%	0.164
850	31.16	1.306	GPRS 2 Slot	25.0%	0.327
850	31.15	1.303	GPRS 3 Slot	37.5%	0.489
850	31.00	1.259	GPRS 4 Slot	50.0%	**0.629**
1900	28.11	0.647	GSM/GPRS	12.5%	0.081
1900	28.04	0.637	GPRS 2 Slot	25.0%	0.159
1900	28.01	0.632	GPRS 3 Slot	37.5%	0.237
1900	27.97	0.627	GPRS 4 Slot	50.0%	**0.313**

Table 3. RF Exposure - ERP/EIRP based on the highest source based duty cycle & the power density

Verification of compliance with rf exposure requirements (MPE) Powers in this table are the average powers after accounting for any source-based duty cycle.							
Frequency (MHz)	Mode	Average Power (W)	**Antenna Gain (dBi)**	Maximum ERP (W)	Maximum EIRP (W)	S @ 20cm (mW/cm^2)	MPE Limit (mW/cm^2)
850	GSM/GPRS 1 slot	0.164	**5.9**	1.405	2.5	0.13	0.57
850	GPRS 2 Slot	0.327				0.25	0.57
850	GPRS 3 Slot	0.489				0.37	0.57
850	GPRS 4 Slot	**0.629**				0.49	0.57
1900	GSM/GPRS 1 Slot	0.081	**4.9**	0.59	1.0	0.05	1
1900	GPRS 2 Slot	0.159				0.10	1
1900	GPRS 3 Slot	0.237				0.15	1
1900	GPRS 4 Slot	**0.313**				0.19	1
Power density is below the limit 20cm from the device. In addition, the erp/eirp values are below the thresholds detailed in FCC § 2.1091 that would require routine evaluation for rf exposure. Devices authorized under subpart H of part 22, parts 24, 25, 26 and 27 are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or if they operate at frequencies above 1.5 GHz and their ERP is 3 watts or more.							

Table 4. Highest peak power to show compliance with part 22/24 ERP/EIRP limits

Verification that EIRP/ERP values comply with FCC Part 22/24						
Frequency (MHz)	Mode	Peak output power (W)	**Antenna Gain (dBi)**	ERP (W)	EIRP (W)	Limit (W)
850	GSM/GPRS	1.309	**5.9**	3.0	-	6.3
1900	GSM/GPRS	0.647	**4.9**	-	2.0	2.0
Radiated power complies with the limits for mobile devices detailed in subpart H of parts 22H and 24E.						