RF Exposure Evaluation – Maximum Permissible Exposure (MPE)

Introduction

This document attempts to prove the safety of radiation generated by RF devices to the human body. The limit for Maximum Permissible Exposure (MPE), specified in FCC 1.1210, is listed below. The power generated by this product is measured by a power meter. Through use of the Friis transmission formula and the maximum gain of the antenna, the distance from the product at which compliance with the MPE limit is achieved may be calculated. Alternatively, near field measurements may be performed to demonstrate compliance at a specific measurement distance.

Near field probe: Wandel & Goltermann EMR-300. Calibration Due: 10/6/2007

This MPE report contains measurements that are applicable to the ML900 when configured with the Motorola WDE1100 Module (FCC ID: AZ489FT7023). Multiple configurations of the ML900 were measured and are reported herein to ensure that the worst case MPE is reported.

EUT:
Model: ML900 S/N: 602CB2CD
Grantee: Motorola
FCC ID: ABZ89FT7619
Contains WLAN Module (WDE1100, FCC ID: AZ489FT7023)

RF Exposure Limit

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).

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	…	…	f/300	6
1500-100,000	…	…	5.0	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

Table H-1. Limits For Maximum Permissible Exposure (MPE)

Friis Transmission Formula

Friis transmission formula: $P_d = (P_{out}*G) / (4\pi r^2)$

Where,
P_d = Power Density (mW/cm^2)
P_{out} = output power to antenna (mW)
G = gain of antenna in linear scale
π = 3.1416
r = distance between observation point and center of the radiator (cm)

EUT Operating Condition

Software provided by the client enabled the EUT to transmit and receive data at lowest, middle, and highest channels individually.

Climate Condition

The temperature and relative humidity: 22˚C and 78% RH

Measurement Results

Frequency (MHz)	Measurement Distance (cm)	Front MPE reading mW/cm^2	Rear MPE reading mW/cm^2	Right MPE reading mW/cm^2	Left MPE reading mW/cm^2	Limit mW/cm^2
2441 (BT)	20	0.0388	0.076	0.0284	0.0516	See Table
2437 (802.11b)						
836.5 (CDMA)						

Table H-2. MPE Measurement Result (Multiple Transmitters – Mid Channel)

Frequency (MHz)	Measurement Distance (cm)	Front MPE reading mW/cm^2	Rear MPE reading mW/cm^2	Right MPE reading mW/cm^2	Left MPE reading mW/cm^2	Limit mW/cm^2
2441 (BT)	20	0.028	0.0762	0.0277	0.0794	See Table
2437 (802.11g)						
836.5 (CDMA)						

Table H-3. MPE Measurement Result (Multiple Transmitters - Mid Channel)

Frequency (MHz)	Measurement Distance (cm)	Front MPE reading mW/cm^2	Rear MPE reading mW/cm^2	Right MPE reading mW/cm^2	Left MPE reading mW/cm^2	Limit mW/cm^2
2441 (BT)	20	0.0308	0.092	0.0366	0.0614	See Table
4942.5 (802.11a)						
836.5 (CDMA)						

Table H-4. MPE Measurement Result (Multiple Transmitters - Mid Channel)

Frequency (MHz)	Measurement Distance (cm)	Front MPE reading mW/cm^2	Rear MPE reading mW/cm^2	Right MPE reading mW/cm^2	Left MPE reading mW/cm^2	Limit mW/cm^2
2441 (BT)	20	0.0327	0.0688	0.032	0.0547	See Table
2437 (802.11b)						
1880 (CDMA)						

Table H-5. MPE Measurement Result (Multiple Transmitters - Mid Channel)

Frequency (MHz)	Measurement Distance (cm)	Front MPE reading mW/cm^2	Rear MPE reading mW/cm^2	Right MPE reading mW/cm^2	Left MPE reading mW/cm^2	Limit mW/cm^2
2441 (BT)	20	0.0391	0.0753	0.0389	0.0636	See Table
2437 (802.11g)						
1880 (CDMA)						

Table H-6. MPE Measurement Result (Multiple Transmitters - Mid Channel)

Frequency (MHz)	Measurement Distance (cm)	Front MPE reading mW/cm^2	Rear MPE reading mW/cm^2	Right MPE reading mW/cm^2	Left MPE reading mW/cm^2	Limit mW/cm^2
2441 (BT)	20	0.0412	0.0617	0.0588	0.0719	See Table
4942.5 (802.11a)						
1880 (CDMA)						

Table H-7. MPE Measurement Result (Multiple Transmitters - Mid Channel)

Note: Measurements are made while all transmitters are operating simultaneously.

Conclusion

The device meets the mobile 20cm separation distance as specified in Section 2.1091 of the FCC Rules. An appropriate RF exposure compliance statement will be placed in the user's manual.