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.

This MPE report contains calculated data that are applicable to the ML910 when configured with the MC5725 CDMA Module (FCC ID: ABZ89FT7624), MC8775 GSM/UMTS Module (FCC ID: ABZ89FT7625) or the DataTAC Modem Module (FCC ID: ABZ89FT7626) and using the external antenna via the car mounting docking station.

When configured with the car docking station (Model: 7160-0029) the ML910 uses an Electromechanical RF Pass-thru switch enabling the RF to be disconnected from the internal antenna and connected to an external antenna. The antenna is a 3dBi gain monopole antenna connected to a 15 foot RF240 coax cable.

EUT:
Model: ML910 S/N: 343AA77S0002 with car docking station

Grantee: Motorola

FCC ID: ABZ89FT7624	CDMA Module Model MC5725
FCC ID: ABZ89FT7625	GMS/UMTS Module Model MC8775
FCC ID: ABZ89FT7626	DataTAC Modem Module Model PRM240

External Antenna: 3dBi ¼ wave monopole antenna

Cable: 12ft to 15ft RF240 coax cable (~1.8dB loss/ 15ft)

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: $P_d = (P_{out} * G) / (4 p r^2)$

Where,

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

Calculated MPE

The highest RF powered measured in each band was used in the MPE calculations. A maximum antenna gain was also used while the cable loss of 1.8dB was factored into the equations to account for the 12 to 15 feet of coax. Additionally the calculations were performed without any duty cycle correction based on radio operation nor with the additional cable loss due to the internal coax cable of the docking station. This method provides the worst case possible MPE to determine compliance with the RF Exposure limits at 20cm. The power density limit for General Population/Uncontrolled Exposure at each frequency is determined based on the information in Table H-1 Limits for Maximum Permissible Exposure (MPE).

Since the antenna is mounted on a 12 to 15 foot coax there is no co-location between the electric fields of any two transmitters therefore the following power densities are calculated only for the individual transmitter with the external antenna.

A separate MPE measurement report details the results of the ML910 using the internal antenna configurations.

Calculated MPE Results

Frequency	836.52	MHz	
Limit	0.558	mW/cm^2	
Distance (cm), R =	20	cm	
Power (dBm), P =	24.51	dBm	186.64 mW
Cable Loss (dB) =	1.8	dB	
TX Ant Gain (dBi), G =	3	dBi	
Power Density (S) =	**0.074**	mW/cm^2	(at 20cm)
Minimum Distance =	**7.3**	cm	

Table H-2: ML910 with MC5725, Cellular Band

Frequency:	1880	MHz	
Limit:	1.000	mW/cm^2	
Distance (cm), R =	20	cm	
Power (dBm), P =	24.44	dBm	183.65 mW
Cable Loss (dB) =	1.8	dB	
TX Ant Gain (dBi), G =	3	dBi	
Power Density (S) =	**0.0729**	mW/cm^2	(at 20cm)
Minimum Distance =	**5.4**	cm	

Table H-3: ML910 with MC5725, PCS Band

Frequency	824.2	MHz	
Limit	0.549	mW/cm^2	
Distance (cm), R =	20	cm	
Power (dBm), P =	31.97	dBm	1039.92 mW
Cable Loss (dB) =	1.8	dB	
TX Ant Gain (dB), G =	3	dBi	
Power Density (S) =	**0.413**	mW/cm^2	(at 20cm)
Minimum Distance =	**17.3**	cm	

Table H-4: ML910 with MC8775, Cellular Band

Frequency	1909.8	MHz	
Limit	1.000	mW/cm^2	
Distance (cm), R =	20	cm	
Power (dBm), P =	29.51	dBm	590.20 mW
Cable Loss (dB) =	1.8	dB	
TX Ant Gain (dB), G =	3	dBi	
Power Density (S) =	**0.234**	mW/cm^2	(at 20cm)
Minimum Distance =	**9.7**	cm	

Table H-5: ML910 with MC8775, PCS Band

Frequency	806	MHz	
Limit	0.537	mW/cm^2	
Distance (cm), R =	20	cm	
Power (dBm), P =	32.84	dBm	1270.57 mW
Cable Loss (dB) =	1.8	dB	
TX Ant Gain (dB), G =	3	dBi	
Power Density (S) =	**0.504**	mW/cm^2	(at 20cm)
Minimum Distance =	**19.4**	cm	

Table H-6: ML910 with PRM240, Low Band

Frequency	821	MHz	
Limit	0.547	mW/cm^2	
Distance (cm), R =	20	cm	
Power (dBm), P =	32.67	dBm	1221.80 mW
Cable Loss (dB) =	1.8	dB	
TX Ant Gain (dB), G =	3	dBi	
Power Density (S) =	**0.485**	mW/cm^2	(at 20cm)
Minimum Distance =	**18.8**	cm	

Table H-7: ML910 with PRM240, High Band

Conclusion

The ML910 with car docking station and external antenna 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.