

RF Exposure Calculation

Applicant: FALCOM GmbH
FCC ID: QIXMAMBO56

The internal antenna used for this mobile transmitter must provide a separation distance of at least 20 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter.

A safety statement concerning minimum separation distances from enclosure of the MAMBO56 will be integrated in the user's manual to provide end-users with transmitter operating conditions for satisfying RF exposure compliance.

The appropriate Max conducted power can be drawn from the test report no. GOM20603-0284-P-2224.

For transmitter operating in the 824-849 MHz range, paragraph 1.1310 Table 1 limits maximum permissible exposure (MPE) to 0.549 mW/cm² for uncontrolled environments and 2.75 mW/cm² for controlled environments.

For transmitter operating in the 1850-1910 MHz range, paragraph 1.1310 Table 1 limits maximum permissible exposure (MPE) to 1 mW/cm² for uncontrolled environments and 5 mW/cm² for controlled environments.

The far field on-axis power flux density (W/m²) is calculated using the following formula:

S = Power density (mW/cm²)
ERP = effective radiated power (mW)
EIRP = isotropically radiated power (mW)
r = Distance in cm

Calculations

GSM 1900			
name		nature value	log value
max conducted power		1011,58 mW	30,05 dBm
max Antenna gain dBi		1,26	1,00 dBi
max Antenna gain dBd		0,77	-1,15 dBd
calculated radiated power	EIRP	1273,50 mW	31,05 dBm
measured radiated power	EIRP	114,02 mW	20,57 dBm
duty cycle factor			
frequency	1880 MHz		
dwelt time		12,5 ms	
Time of occupancy/puls-train time		100 ms	
duty cycle fact	10log(dwelt time/100 ms)	12,50%	-9,03 dB
max source-based time-averaged power			
conducted power		126,45 mW	21,02 dB
calculated radiated power	EIRP	159,19 mW	22,02 dB
measured radiated power	EIRP	14,25 mW	11,54 dB
MPE			
$S = \frac{PG}{4\pi R^2}$ calculated with max source-based time-averaged power measured conducted power			
	r [cm]	20	2,5 1,5
	S [mW/cm ²]	0,032	
Limit general population	[mW/cm ²]	1,000	
Limit occupational popul	[mW/cm ²]	5,00	for f = 1880 MHz
$S = \frac{EIRP}{4\pi R^2} = \frac{1.64 ERP}{4\pi R^2} = \frac{0.41 ERP}{\pi R^2}$ calculated with max source-based time-averaged power measured radiated power			
	r [cm]	20	2,5 1,5
	S [mW/cm ²]	0,003	1

GSM 850			
name		nature value	log value
max conducted power		1874,99 mW	32,73 dBm
max Antenna gain dBi		1,26	1,00 dBi
max Antenna gain dBd		0,77	-1,15 dBd
calculated radiated power	ERP	1439,32 mW	31,58 dBm
measured radiated power	ERP	687,07 mW	28,37 dBm
duty cycle factor			
frequency	836 MHz		
dwel time		12,5 ms	
Time of occupancy/puls-train time		100 ms	
duty cycle fact	10log(dwel time/100 ms)	12,50%	-9,03 dB
max source-based time-averaged power			
conducted power		234,37 mW	23,70 dB
calculated radiated power	ERP	179,91 mW	22,55 dB
measured radiated power	ERP	85,88 mW	19,34 dB
M P E			
calculated with max source-based time-averaged power measured conducted power			
$S = \frac{PG}{4\pi R^2}$	r [cm]	20	2,5
	S [mW/cm ²]	0,059	1,5
Limit general population	[mW/cm ²]	0,557	
Limit occupational popul	[mW/cm ²]	2,79	for f = 836 MHz
calculated with max source-based time-averaged power measured radiated power			
$S = \frac{EIRP}{4\pi R^2} = \frac{1.64 ERP}{4\pi R^2} = \frac{0.41 ERP}{\pi R^2}$	r [cm]	20	2,5
	S [mW/cm ²]	0,028	1,5