

RF Exposure Calculation

Applicant: FALCOM GmbH
FCC ID: QIXSTEPPIII

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 STEPPIII 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. GOM20704-1336-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			701,46 mW	28,46 dBm	
max Antenna gain dBi			2,00	3,00 dBi	
max Antenna gain dBd			1,22	0,85 dBd	
calculated radiated power	EIRP		1399,59 mW	31,46 dBm	
	ERP				
measured radiated power	EIRP		504,66 mW	27,03 dBm	
	ERP				
duty cycle factor					
frequency		1880 MHz			
dwell time			12,5 ms		
Time of occupancy/puls-train time			100 ms		
duty cycle fact	10log(dwell time/100 ms)		12,50%	-9,03 dB	
max source-based time-averaged power					
conducted power			87,68 mW	19,43 dB	
calculated radiated power		EIRP	174,95 mW	22,43 dB	
measured radiated power		EIRP	63,08 mW	18,00 dB	
M P E					
$S = \frac{PG}{4\pi R^2}$		calculated with max source-based time-averaged power			
		measured conducted power			
		r [cm]	20	2,5	1,5
		S [mW/cm²]	0,035		1
Limit general population		[mW/cm²]	1,000	for f = 1880 MHz	
Limit occupational popul		[mW/cm²]	5,00		
$S = \frac{EIRP}{4\pi R^2} = \frac{1.64 ERP}{4\pi R^2} = \frac{0.41 ERP}{\pi R^2}$		calculated with max source-based time-averaged power			
		measured radiated power			
		r [cm]	20	2,5	1,5
		S [mW/cm²]	0,013		1

GSM 850			
name		nature value	log value
max conducted power		1534,62 mW	31,86 dBm
max Antenna gain dBi		2,00	3,00 dBi
max Antenna gain dBd		1,22	0,85 dBd
calculated radiated power	EIRP		
	ERP	1867,05 mW	32,71 dBm
measured radiated power	EIRP		
	ERP	1145,51 mW	30,59 dBm
duty cycle factor			
frequency	824 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		191,83 mW	22,83 dB
calculated radiated power	EIRP	382,75 mW	25,83 dB
measured radiated power	EIRP	143,19 mW	21,56 dB
M P E			
$S = \frac{PG}{4\pi R^2}$			
calculated with max source-based time-averaged power			
measured conducted power			
	r [cm]	20	2,5
	S [mW/cm ²]	0,076	0,549
Limit general population	[mW/cm ²]	0,549	
Limit occupational popul	[mW/cm ²]	2,75	for f = 824 MHz
calculated with max source-based time-averaged power			
measured radiated power			
	r [cm]	20	2,5
	S [mW/cm ²]	0,029	3,38
			1,000