

RF Exposure Calculation

Applicant: proveo AG
FCC ID: I28INFOMANE1

The 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 I28INFOMANE1 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. G0M20710-0208-P-2224; G0M20710-0208-C-1

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 850

name	nature value	log value
max conducted power	950,60 mW	29,78 dBm
max Antenna gain dBi	1,26	1,00 dBi
max Antenna gain dBd	0,77	-1,15 dBd
calculated radiated power	EIRP	
	ERP	729,72 mW 28,63 dBm
duty cycle factor		
frequency	848 MHz	
dwll time	100 ms	
Time of occupancy/puls-train time	100 ms	
duty cycle factor	10log(dwll time/100 ms) 100,00%	0,00 dB
max source-based time-averaged power		
conducted power	950,60 mW	29,78 dB
calculated radiated power	ERP 729,72 mW	28,63 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/cm ²]	0,238	0,565
Limit general population	[mW/cm ²]	0,565
Limit occupational population	[mW/cm ²]	2,83 for f = 848 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]	0,224	1

GSM 1900

name	nature value	log value
max conducted power	230,67 mW	23,63 dBm
max Antenna gain dBi	1,26	1,00 dBi
max Antenna gain dBd	0,77	-1,15 dBd
calculated radiated power	EIRP ERP 290,40 mW	24,63 dBm
duty cycle factor		
frequency	1910 MHz	
dwel time	100 ms	
Time of occupancy/puls-train time	100 ms	
duty cycle factor	$10\log(\text{dwell time}/100 \text{ ms})$ 100,00%	0,00 dB
max source-based time-averaged power		
conducted power	230,67 mW	23,63 dB
calculated radiated power	EIRP 290,40 mW	24,63 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/cm ²]	0,058	1
Limit general population	[mW/cm ²]	1,000
Limit occupational population	[mW/cm ²]	5,00 for f = 1910 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]	0,023	1

EGPRS 850

name	nature	value	log value
max conducted power		903,65 mW	29,56 dBm
max Antenna gain dBi		1,26	1,00 dBi
max Antenna gain dBd		0,77	-1,15 dBd
calculated radiated power	EIRP		
	ERP	693,68 mW	28,41 dBm
duty cycle factor			
frequency		848 MHz	
dwel time		100 ms	
Time of occupancy/puls-train time		100 ms	
duty cycle factor	10log(dwel time/100 ms)	100,00%	0,00 dB
max source-based time-averaged power			
conducted power		903,65 mW	29,56 dB
calculated radiated power	ERP	693,68 mW	28,41 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/cm²]	0,226		0,565
Limit general population	[mW/cm²]	0,565	
Limit occupational population	[mW/cm²]	2,83	for f = 848 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
S [mW/cm²]	0,224		1

EGPRS 1900

name	nature	value	log value	
max conducted power		224,39 mW	23,51 dBm	
max Antenna gain dBi		1,26	1,00 dBi	
max Antenna gain dBd		0,77	-1,15 dBd	
calculated radiated power	EIRP	282,49 mW	24,51 dBm	
	ERP			
duty cycle factor				
frequency		1910 MHz		
dwelt time		100 ms		
Time of occupancy/puls-train time		100 ms		
duty cycle factor	10log(dwelt time/100 ms)	100,00%	0,00 dB	
max source-based time-averaged power				
conducted power		224,39 mW	23,51 dB	
calculated radiated power	EIRP	282,49 mW	24,51 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]		0,056		1
Limit general population	[mW/cm²]	1,000		
Limit occupational population	[mW/cm²]	5,00	for f = 1910 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/cm²]		0,023		1