

8. RADIO FREQUENCY EXPOSURE

8.1. Limit

According to §1.1310 and §2.1091 RF exposure is calculated.

Table: Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Power Density (S) (mW/cm ²)
0.3–1.34	*(100)
1.34–30	*(180/f ²)
30–300	0.2
300–1500	f/1500
1500–100,000	1.0

F = frequency in MHz

* = Plane-wave equivalent power density

Maximum Permissible Exposure

The MPE was calculated at 20cm to show compliance with the power density limit.

$$S = PG/4\pi R^2$$

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna.

Note:

1. Manufacturer declared that the maximum antenna gain is 3.0dBi for TX.
2. Manufacturer declared that the nearest distance between human and the EUT is 20cm.
3. Only record worst case data.

GSM 850

Conducted Peak output Power in dBm	31.24	dBm
Max. Conducted Peak output Power in mW	1330.4544	mW
Prediction distance	20	cm
Prediction frequency	848.8	MHz
Antenna Gain(typical)	3.0	dBi
Antenna Gain(numeric)	2.0	
Power density at prediction frequency(S)	0.52964	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1	mW/cm ²

GPRS 850(Slot 1)

Conducted Peak output Power in dBm	30.35	dBm
Max. Conducted Peak output Power in mW	1083.9269	mW
Prediction distance	20	cm
Prediction frequency	824.2	MHz
Antenna Gain(typical)	3.0	dBi
Antenna Gain(numeric)	2.0	
Power density at prediction frequency(S)	0.43200	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1	mW/cm ²

GPRS 850(Slot 2)

Conducted Peak output Power in dBm	28.44	dBm
Max. Conducted Peak output Power in mW	698.2324	mW
Prediction distance	20	cm
Prediction frequency	836.6	MHz
Antenna Gain(typical)	3.0	dBi
Antenna Gain(numeric)	2.0	
Power density at prediction frequency(S)	0.27796	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1	mW/cm ²

GPRS 850(Slot 3)

Conducted Peak output Power in dBm	27.20	dBm
Max. Conducted Peak output Power in mW	524.8075	mW
Prediction distance	20	cm
Prediction frequency	848.8	MHz
Antenna Gain(typical)	3.0	dBi
Antenna Gain(numeric)	2.0	
Power density at prediction frequency(S)	0.20892	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1	mW/cm ²

GPRS 850(Slot 4)

Conducted Peak output Power in dBm	26.58	dBm
Max. Conducted Peak output Power in mW	454.9881	mW
Prediction distance	20	cm
Prediction frequency	824.2	MHz
Antenna Gain(typical)	3.0	dBi
Antenna Gain(numeric)	2.0	
Power density at prediction frequency(S)	0.18113	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1	mW/cm ²

PCS 1900

Conducted Peak output Power in dBm	28.62	dBm
Max. Conducted Peak output Power in mW	727.7798	mW
Prediction distance	20	cm
Prediction frequency	1850.2	MHz
Antenna Gain(typical)	3.0	dBi
Antenna Gain(numeric)	2.0	
Power density at prediction frequency(S)	0.28972	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1	mW/cm ²

GPRS 1900(Slot 1)

Conducted Peak output Power in dBm	27.39	dBm
Max. Conducted Peak output Power in mW	548.2770	mW
Prediction distance	20	cm
Prediction frequency	1850.2	MHz
Antenna Gain(typical)	3.0	dBi
Antenna Gain(numeric)	2.0	
Power density at prediction frequency(S)	0.21826	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1	mW/cm ²

GPRS 1900(Slot 2)

Conducted Peak output Power in dBm	26.44	dBm
Max. Conducted Peak output Power in mW	440.5549	mW
Prediction distance	20	cm
Prediction frequency	1850.2	MHz
Antenna Gain(typical)	3.0	dBi
Antenna Gain(numeric)	2.0	
Power density at prediction frequency(S)	0.17538	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1	mW/cm ²

GPRS 1900(Slot 3)

Conducted Peak output Power in dBm	25.39	dBm
Max. Conducted Peak output Power in mW	345.9394	mW
Prediction distance	20	cm
Prediction frequency	1909.8	MHz
Antenna Gain(typical)	3.0	dBi
Antenna Gain(numeric)	2.0	
Power density at prediction frequency(S)	0.13771	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1	mW/cm ²

GPRS 1900(Slot 4)

Conducted Peak output Power in dBm	24.28	dBm
Max. Conducted Peak output Power in mW	267.9168	mW
Prediction distance	20	cm
Prediction frequency	1850.2	MHz
Antenna Gain(typical)	3.0	dBi
Antenna Gain(numeric)	2.0	
Power density at prediction frequency(S)	0.10665	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1	mW/cm ²

8.2 Test Results

The power density level worst case at 20 cm is below the uncontrolled exposure limit.