

Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-6907-23-01-06_TR1-R02 MPE (FCC/ISED)

Certification numbers and labeling requirements	
FCC ID	L3M-ITC2800VHF
ISED number	4404A-ITC2800VHF
Kind of Test Item	Paging-Base Station
Product Name	ITC2800 VHF
HVIN (Hardware Version Identification Number)	ITC2800 50W VHF -48V
PMN (Product Marketing Name)	SWISSPHONE ITC2800

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EUT technologies:

Technologies:	Max. power [dBm]		Antenna gain max.: [dBi]	#
	conducted	EIRP		
VHF	47.78	49.93	2.15	A
LTE	26.00	34.00	8	

Details and origins of the measurements shown in the table above:

#	Results from:	Additional information
A	FCC Ant Info VHF from ITC2800 Manual Rev2	+20% tune up tolerance

Minimum safety distance declared by manufacturer: 250cm

Prediction of MPE limit at given distance - FCC

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

where: S = Power density
P = Power input to the antenna
G = Antenna gain
R = Distance to the center of radiation of the antenna
PG = Output power including antenna gain (EIRP)

The table below is excerpted from Table 1 - Limits for Maximum Permissible Exposure (MPE) - "General Public/Uncontrolled Exposure" according 47 CFR 1.1310 (e) (1).

Frequency Range (MHz)	Power Density (mW/cm ²)	Averaging Time (minutes)
3-30	180/f ²	30
30-300	0.2	30
300-1500	f/1500	30
1500-100,000	1	30

where f = Frequency (MHz)

¹⁾ Extended according FCC 19-126

Prediction: worst case

	Technology	VHF	LTE	
	Frequency	175	699	MHz
P·G	Meas. EIRP	49.93	34	dBm
R	Distance	250	250	cm
S	MPE limit for uncontrolled exposure	0.20	0.47	mW/cm ²
	Calculated Power density:	0.125	0.003	W/m ²
	Calculated percentage of limit:	62.68%	0.69%	
	Sum percentage of limit:	63.37%		

This prediction demonstrates the following:

The power density levels for FCC at a distance of 250 cm are below the maximum levels allowed by regulations for controlled exposure.

Prediction:LTE Standalone worst case

	Technology	LTE	
	Frequency	699	MHz
P·G	Meas. EIRP	34	dBm
R	Distance	30	cm
S	MPE limit for uncontrolled exposure	0.5	mW/cm ²
	Calculated Power density:	0.2222	mW/cm ²
	Calculated percentage of limit:	47.69%	

This prediction demonstrates the following:

The power density levels for FCC at a distance of 30 cm are below the maximum levels allowed by regulations for controlled exposure.

Prediction of MPE limit at given distance - ISED

RSS-102, Issue 6, chapter 5 Reference levels for general public (uncontrolled environment):

According to: RSS 102-ISSUE 06				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
10-20	27.46	0.0728	2	6
20-48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000 / f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000 / f^{1.2}$
Note: f is frequency in MHz.				

Prediction: worst case 250 cm

	Technology	VHF	LTE	
	Frequency	175	699	MHz
P·G	Meas. EIRP	49.93	34	dBm
R	Distance	250	250	cm
S	MPE limit for uncontrolled exposure	1.29	2.30	W/m ²
	Calculated Power density:	1.254	0.032	W/m ²
	Calculated percentage of limit:	97.10%	1.39%	
	Sum percentage of limit:	98.49%		

Conclusion: RF exposure evaluation is not required.

Prediction: worst case LTE Standalone 30 cm

	Technology	LTE	
	Frequency	699	MHz
P·G	Meas. EIRP	34	dBm
R	Distance	30	cm
S	MPE limit for uncontrolled exposure	2.30	W/m ²
	Calculated Power density:	2.222	W/m ²
	Calculated percentage of limit:	96.54%	

Conclusion: RF exposure evaluation is not required.