

Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-6907-23-01-11_TR1-R01 MPE (FCC/ISED)

Certification numbers and labeling requirements	
FCC ID	L3M-ITC2800UHF
ISED number	4404A-ITC2800UHF
Kind of Test Item	Paging-Base Station
Product Name	ITC2800 UHF
HVIN (Hardware Version Identification Number)	ITC2800 40W UHF -48V
PMN (Product Marketing Name)	SWISSPHONE ITC2800

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

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EUT technologies:

Technologies:	Max. power [dBm]		Antenna gain max.: [dBi]	#
	conducted	EIRP		
UHF	44.81	46.81	2	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 UHF 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	UHF	LTE	
	Frequency	421.25	699	MHz
P·G	Meas. EIRP	46.81	34	dBm
R	Distance	250	250	cm
S	MPE limit for uncontrolled exposure	0.28	0.47	mW/cm ²
	Calculated Power density:	0.061	0.003	mW/cm ²
	Calculated percentage of limit:	21.76%	0.69%	
	Sum percentage of limit:	22.45%		

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:	0.222	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	UHF	LTE	
	Frequency	421	699	MHz
P·G	Meas. EIRP	46.81	34	dBm
R	Distance	250	250	cm
S	MPE limit for uncontrolled exposure	1.63	2.30	W/m ²
	Calculated Power density:	0.611	0.032	W/m ²
	Calculated percentage of limit:	37.55%	1.39%	
	Sum percentage of limit:	38.94%		

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.