UWIS INDS100 MPE CALCULATION

Inductive communication module maximum permissible exposure

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Contents

1. Object of the Document

Description of inductive transmitter maximum permissible exposure.

2. FCC regulation limits

Limits for Maximum Permissible Exposure (MPE) - from §1.1310

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Averaging Time (minutes)
0.3-3.0	614	1.63	100 †	6
3.0-30	1842/f	4.89/f	900/f2 †	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Averaging Time (minutes)
0.3-3.0	614	1.63	100 †	30
3.0-30	842/f	2.19/f	180/f2 †	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz
† = plane-wave equivalent power density (see note)
Note: Equivalent far field strength that would have the E-field or H-field components calculated or measured.
Equivalent far field density for near and far fields can be calculated using
Power Density = |Etotal|2/3770 mW/cm2 or Power Density = |Htotal|2/37.7 mW/cm2

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3. MPE calculation

Transmit carrier frequency 123076.92 Hz binary phase-shift keying (BPSK) modulation

Peak power 25 dBm = 316 mW

Pulsed average 20 ms / 1000 ms x 316 mW = 6,32 mW

Antenna gain estimated < 2

S = (P x G)/(4 x π x d^2) – used to calculate exposure at 20 cm

Distance	Power	Gain	Exposure
D / cm	P / mW	G	S / mW/cm2
20	6,32	2	0,00251465

4. Result

MPE calculation shows that the total power density at 20cm is less than FCC limits.

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