

DEKRA Testing and Certification S.A.U.

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Report: 53299_LE910C1-NS

RF exposure analysis for the equipment – Maximum Antenna Gain

Model: LE910C1-NS

FCC ID: R17LE910C1NS

IC: 5131A-LE910C1NS

The device Telit LE910C1-NS is a module designed to be installed in other devices. This device is to be used only for fixed and mobile applications. If the final product after integration is intended for portable use, new applications and FCC and ISED are required.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all the persons and must not be co-located or operating in conjunction with any other antenna or transmitter except as under the conditions described KDB 447498 D01 General RF Exposure Guidance.

MPE exposure limits

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure:

Frequency Range (MHz)	Power density (mW/cm ²)	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100.000	1,0	30

The table below is excerpted from RSS-102, Issue 5, 4, titled “Table 4: RF Field Strength Limits for Devices Used by the General Public”:

Frequency Range (MHz)	Power density (W/m ²)	Averaging time (minutes)
300 – 6000	$0.02619 \cdot f^{0.6834}$	6

EIRP limits

Band	Frequency (MHz) (Lowest Frequency)	FCC MPE limit (mW/cm ²)	ISED MPE limit (mW/cm ²)	FCC/IC MPE limit (mW/cm ²)	FCC EIRP limit (W)	ISED EIRP limit (W)
FDD 5	820,0	0,547	0,257	0,25671	11,48	11,50
FDD 26	814,0	0,543	0,255	0,25542	11,48	11,50
FDD 4	1710,0	1,000	0,424	0,42419	1,00	1,00
FDD 2	1850,0	1,000	0,448	0,44763	2,00	2,00
FDD 25	1850,0	1,000	0,448	0,44763	2,00	2,00
FDD 12	699,0	0,466	0,230	0,23017	4,92	5,00

Using the equation $S = \frac{PG}{4\pi R^2}$ to calculate the exposure to electromagnetic fields

where: S = power density (in appropriate units, e.g. mW/cm²)
P = power input to the antenna (in appropriate units, e.g., mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the centre of radiation of the antenna (appropriate units, e.g., cm)

The maximum antenna gain that can be used in the LE910C1-NS is shown in the following table:

Band	Frequency (MHz) (Lowest Frequency)	Maximum conducted output power (per tune-up) (dBm)	Duty cycle (%)	FCC MPE limit (mW/cm ²)	ISED MPE limit (mW/cm ²)	FCC/IC MPE limit (mW/cm ²)	FCC EIRP limit (W)	ISED EIRP limit (W)	Evaluation distance for compliance with MPE limits (cm)	Antenna gain to meet FCC/ISED MPE limit (dBi)	Antenna gain to meet FCC EIRP limit (dBi)	Antenna gain to meet ISED EIRP limit (dBi)	Maximum antenna gain to meet all the limits (dBi)	Maximum antenna gain to meet all the limits per frequency band (dBi)
FDD 5	820,0	25,00	100,0%	0,547	0,257	0,25671	11,48	11,50	20	6,10	15,59	15,60	6,10	6,08
FDD 26	814,0	25,00	100,0%	0,543	0,255	0,25542	11,48	11,50	20	6,08	15,59	15,60	6,08	
FDD 4	1710,0	25,00	100,0%	1,000	0,424	0,42419	1,00	1,00	20	8,28	5,00	5,00	5,00	8,01
FDD 2	1850,0	25,00	100,0%	1,000	0,448	0,44763	2,00	2,00	20	8,52	8,01	8,01	8,01	
FDD 25	1850,0	25,00	100,0%	1,000	0,448	0,44763	2,00	2,00	20	8,52	8,01	8,01	8,01	
FDD 12	699,0	25,00	100,0%	0,466	0,230	0,23017	4,92	5,00	20	5,63	11,91	11,98	5,63	5,63

Band	Frequency (MHz) (Lowest Frequency)	Maximum conducted output power (per tune-up) (dBm)	Duty cycle (%)	Antenna gain (dBi)	FCC/IC MPE limit (mW/cm ²)	FCC EIRP limit (W)	ISED EIRP limit (W)	FCC/ISED EIRP limit (W)	Evaluation distance for compliance with MPE limits (cm)	$S = \frac{PG}{4\pi R^2}$ (mW/cm ²)	MPE Ratio (S/MPE limit)
FDD 5	820,0	25,00	100,0%	6,08	0,25671	11,48	11,50	11,48	20	0,25511	0,99379
FDD 26	814,0	25,00	100,0%	6,08	0,25542	11,48	11,50	11,48	20	0,25511	0,99879
FDD 4	1710,0	25,00	100,0%	5,00	0,42419	1,00	1,00	1,00	20	0,19894	0,46899
FDD 2	1850,0	25,00	100,0%	8,01	0,44763	2,00	2,00	2,00	20	0,39786	0,88881
FDD 25	1850,0	25,00	100,0%	8,01	0,44763	2,00	2,00	2,00	20	0,39786	0,88881
FDD 12	699,0	25,00	100,0%	5,63	0,23017	4,92	5,00	4,92	20	0,23000	0,99926

Yours sincerely,
P.A.



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