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RF exposure analysis for the equipment TL2803GRE, TL2803GE, 3G2080RE, 3G2080E (FCC ID: F5316TL2803GRE; IC: 160A-TL2803GRE)

The devices TL2803GRE, TL2803GE, 3G2080RE and 3G2080E (FCC ID: F5316TL2803GRE; IC: 160A-TL2803GRE) are cellular alarm communicator device integrating a module 2G/3G (Telit UE910-NAR). This device is to be used only for fixed and mobile applications.

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 (Uncontrolled Environment)”:

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

EIRP/ERP limits

For 850 MHz frequency band and according to FCC §22.913 the maximum ERP of the device is 7 W (equivalent to 11,48 W EIRP) while IC SRSP-503 defines an EIRP limit of 11,5 W.

For 1900 MHz frequency band and according to FCC §24.232 and IC SRSP-510, the maximum EIRP of the device should be lower than 2 W.

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 center of radiation of the antenna (appropriate units, e.g., cm)

compliance with FCC/IC MPE and EIRP limits is demonstrated following the calculations shown in the following page.

Frequency Band	Mode	Frequency Range (MHz)	Reference frequency (Lowest freq.) (MHz)	Maximum conducted output power (per tune-up) (dBm)	Maximum number of TX slots	Duty cycle (%)	FCC MPE limit (mW/cm ²)	IC MPE limit (mW/cm ²)	FCC EIRP limit per §22.913 and §24.232 (W)	IC EIRP limit per SRSP-503, SRSP-510, SRSP-513 and SRSP-518 (W)	Evaluation distance for compliance with MPE limits (cm)	Antenna gain to meet FCC MPE limit (dBi)	Antenna gain to meet IC MPE limit (dBi)	Antenna gain to meet FCC EIRP limit (dBi)	Antenna gain to meet IC EIRP limit (dBi)	Maximum antenna gain to meet all the limits (dBi)	Maximum antenna gain to meet all the limits per frequency band (dBi)
GSM 850	GPRS/EDGE	824.2 - 848.8	824.2	33,50	1	25,0%	0,54947	0,25760	11,48	11,50	20	6,93	3,64	7,09	7,10	3,64	Maximum antenna gain for 850 MHz frequency band: 3,64 dBi
FDD V	WCDMA/HSPA	826,4 - 846,6	826,4	24,00	N/A	100%	0,55093	0,25807	11,48	11,50	20	10,42	7,13	16,59	16,60	7,13	
PCS 1900	GPRS/EDGE	1850.2 - 1909.8	1850.2	30,50	1	25,0%	1,00000	0,44766	2,00	2,00	20	12,53	9,04	2,51	2,51	2,51	Maximum antenna gain for 1900 MHz frequency band: 2,51 dBi
FDD II	WCDMA/HSPA	1852.4 - 1907.6	1852,4	24,00	N/A	100%	1,00000	0,44803	2,00	2,00	20	13,01	9,52	9,01	9,01	9,01	

With this antenna gain figures the maximum RF exposure can be found the table below:

Frequency Band	Mode	Frequency Range (MHz)	Maximum conducted output power (per tune-up) (dBm)	Maximum number of TX slots	Duty cycle (%)	Antenna gain (dBi)	Evaluation distance for compliance with MPE limits (cm)	$S = \frac{PG}{4\pi R^2}$ (mW/cm ²)	MPE limit (FCC/IC worst case) (mW/cm ²)
GSM 850	GPRS/EDGE	824.2 - 848.8	33,50	1	25,0%	3,64	20	0,25744	0,25760
FDD V	WCDMA/HSPA	826,4 - 846,6	24,00	N/A	100%	3,64	20	0,11554	0,25807
PCS 1900	GPRS/EDGE	1850.2 - 1909.8	30,50	1	25,0%	2,51	20	0,09946	0,44766
FDD II	WCDMA/HSPA	1852.4 - 1907.6	24,00	N/A	100%	2,51	20	0,08907	0,44803

Yours sincerely,



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