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RF exposure analysis for the equipment TL2553GR-E, TL2553G-E, 3G2055R-E, 3G2055-E (FCC ID: F5315TL2553GRE; IC: 160A-TL2553GR E)

The devices TL2553GR-E, TL2553G-E, 3G2055R-E and 3G2055-E (FCC ID: F5315TL2553GRE; IC: 160A-TL2553GRE) 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, section 4, titled “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
6000 – 15000	10	6
15000 - 150000	10	616000 / f ^{1.2}

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.



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Band	Modulation	Test Mode	Channel	Frequency (MHz)	Avg burst Conducted power (dBm)	Duty cycle (%)	FCC/IC MPE limit (mW/cm ²)	FCC EIRP limit per §22.913 and §24.232 (W)	IC EIRP limit per SRSP-503 and SRSP-510 (W)	Evaluation distance for compliance with MPE limits (cm)	Antenna gain to meet FCC/IC MPE limit (dBi)	Antenna gain to meet FCC EIRP limit (dBi)	Antenna gain to meet IC EIRP limit (dBi)	Maximun antenna gain to meet all the limits (dBi)	Maximun antenna gain to meet all the limits per frequency band (dBi)	
GPRS 850	GMSK	2 of 8 transmission slots Duty factor 1/4	Lowest	128	824,2	29,69	25,0%	0,26	11,48	11,50	20	7,45	10,90	10,91	7,45	Maximun antenna gain for 850 MHz frequency band: 6,69
			Middle	190	836,6	29,69	25,0%	0,26	11,48	11,50	20	7,49	10,90	10,91	7,49	
			Highest	251	848,8	29,79	25,0%	0,26	11,48	11,50	20	7,44	10,80	10,81	7,44	
EGPRS 850	8PSK	2 of 8 transmission slots Duty factor 1/4	Lowest	128	824,2	26,29	25,0%	0,26	11,48	11,50	20	10,85	14,30	14,31	10,85	
			Middle	190	836,6	26,29	25,0%	0,26	11,48	11,50	20	10,89	14,30	14,31	10,89	
			Highest	251	848,8	26,09	25,0%	0,26	11,48	11,50	20	11,14	14,50	14,51	11,14	
FDD V	QPSK	Duty factor 100%	Lowest	4132	826,4	24,40	100,0%	0,26	11,48	11,50	20	6,73	16,19	16,20	6,73	
			Middle	4182	836,4	24,47	100,0%	0,26	11,48	11,50	20	6,69	16,12	16,13	6,69	
			Highest	4233	846,6	24,45	100,0%	0,26	11,48	11,50	20	6,75	16,14	16,15	6,75	
GPRS 1900	GMSK	2 of 8 transmission slots Duty factor 1/4	Lowest	512	1850,2	23,28	25,0%	0,45	2,00	2,00	20	16,26	9,73	9,73	9,73	Maximun antenna gain for 1900 MHz frequency band: 9,31
			Highest	661	1880,0	23,18	25,0%	0,45	2,00	2,00	20	16,41	9,83	9,83	9,83	
			Highest	810	1909,8	23,18	25,0%	0,46	2,00	2,00	20	16,45	9,83	9,83	9,83	
EGPRS 1900	8PSK	2 of 8 transmission slots Duty factor 1/4	Lowest	512	1850,2	21,68	25,0%	0,45	2,00	2,00	20	17,86	11,33	11,33	11,33	
			Highest	661	1880,0	21,78	25,0%	0,45	2,00	2,00	20	17,81	11,23	11,23	11,23	
			Highest	810	1909,8	21,88	25,0%	0,46	2,00	2,00	20	17,75	11,13	11,13	11,13	
FDD II	QPSK	Duty factor 100%	Lowest	9262	1852,4	23,70	100,0%	0,45	2,00	2,00	20	9,82	9,31	9,31	9,31	
			Highest	9400	1880,0	23,66	100,0%	0,45	2,00	2,00	20	9,90	9,35	9,35	9,35	
			Highest	9538	1907,6	23,68	100,0%	0,46	2,00	2,00	20	9,93	9,33	9,33	9,33	

As the gain of the antenna used by this device is below the above limits, this device is in compliance.

Yours sincerely,

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