

TUV SUD BABT TCB

Octagon House,
Segensworth Road,
Fareham,
Hampshire,
PO15 5RL

Date: **06/24/2015**

REF: **RF exposure analysis**

Model: **HE910-GL** FCC ID: **R17HE910GL** IC: **5131A-HE910GL**

The device 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 IC 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 (Uncontrolled Environment)":

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

EIRP/ERP limits

Frequency Band	"FCC EIRP limit per §22.913, §24.232 and §27.50 (W)"	"IC EIRP limit per SRSP-503, SRSP-510, SRSP-513 and SRSP-518 (W)"
850 MHz	11,48	11,50
1700 MHz	1,00	1,00
1900 MHz	2,00	2,00

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 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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Frequency Band	Mode	Frequency Range (MHz)	Reference frequency (Lowest freq.) (MHz)	Maximum conducted output power (per tone-up) (dBm)	Multi-slot Class	Maximum number of TX slots	Duty cycle (%)	FCC MPE limit (mW/cm ²)	IC MPE limit (mW/cm ²)	FCC ERP limit per §22.913, §24.232 and §27.50 (W)	IC ERP limit per SRSP-503, SRSP-510, SRSP-513 and SRSP-516 (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 ERP limit (dBi)	Antenna gain to meet IC ERP 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	GSM/GPRS/EDGE	824.2 - 848.2	824.2	33.00	10	2	25%	0.549	0.258	11.48	11.50	20	7.43	4.14	7.59	7.80	4.14	Maximum antenna gain for 850 MHz frequency band: 4.14 dBi
FDD V	UMTS/HSPA	826.4 - 846.6	826.4	23.90	N/A	N/A	100%	0.551	0.258	11.48	11.50	20	10.52	7.23	16.69	16.70	7.23	
FDD IV	UMTS/HSPA	1712.4 - 1752.6	1712.4	23.70	N/A	N/A	100%	1.000	0.425	1.00	1.00	20	13.31	9.58	6.30	6.30	6.30	Maximum antenna gain for 1700 MHz frequency band: 6.30 dBi
GSM 1900	GSM/GPRS/EDGE	1850.2 - 1909.8	1850.2	30.00	10	2	25%	1.000	0.448	2.00	2.00	20	13.03	9.54	3.01	3.01	3.01	Maximum antenna gain for 1900 MHz frequency band: 3.01 dBi
FDD II	UMTS/HSPA	1852.4 - 1907.6	1852.4	23.90	N/A	N/A	100%	1.000	0.448	2.00	2.00	20	13.11	9.62	9.11	9.11	9.11	

If you have any doubt please do not hesitate to contact us.

Yours sincerely,

Antonino Sgroi
EMEA R&D Manager