

BABT TCB

Balfour House,
Churchfield Road,
Walton-on-Thames,
Surrey,
KT12 2TD

Date: **July 01, 2013**

RF exposure analysis for the equipment CNN0403 (FCC ID: PKRNVWCNN0403; IC: 3229A-CNN0403)

The device (FCC ID: PKRNVWCNN0403; IC: 3229A-CNN0403) 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 4, 4.2, titled “RF Limits for Devices used by the General Public”:

Frequency Range (MHz)	Power density (W/m ²)	Averaging time (minutes)
300 – 1500	f (MHz) /150	6
1500 – 100.000	10	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.

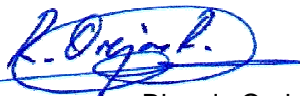
Using the equation $S = \frac{PG}{4\pi R^2}$ to calculate the exposure to electromagnetic fields

- 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.

Band	Modulation	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 ERP limit (dBi)	Antenna gain to meet IC ERP 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	33,50	25,0%	0,55	11,48	11,50	20	6,93	7,09	7,10	6,93	Maximun antenna gain for 850 MHz frequency band:
EGPRS 850	8PSK	28,00	50,0%	0,55	11,48	11,50	20	9,42	12,59	12,60	9,42	
FDD V	QPSK	24,00	100,0%	0,55	11,48	11,50	20	10,42	16,59	16,60	10,42	6,93
GPRS 1900	GMSK	31,00	25,0%	1,00	2,00	2,00	20	12,03	2,01	2,01	2,01	Maximun antenna gain for 1900 MHz frequency band:
EGPRS 1900	8PSK	27,00	50,0%	1,00	2,00	2,00	20	13,02	6,01	6,01	6,01	
FDD II	QPSK	24,00	100,0%	1,00	2,00	2,00	20	13,01	9,01	9,01	9,01	2,01

Yours sincerely,



Name: Ricardo Orejas
 Position: WCS Consultant
 Company: AT4 wireless, S.A.
 Address: Parque Tecnológico de Andalucía, C/ Severo Ochoa 2, 29590 Campanillas-Málaga, Spain
 Telephone: +34 952 619 317
 Fax: +34 952 619 113
 e-mail: rorejas@at4wireless.com