DAI TELECOM
Dai Telecom Group

attn: Reviewing Engineer
Federal Communications Commission
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MPE CALCULATION FOR GPRS HANDHELD MODE OF THE EQUIPMENT G83

FCC ID Number Product	Title/Model
RI7G83	GSM/GPRS Triband phone / G83

TO WHOM IT MAY CONCERN

In GPRS handheld mode we can assume a separation distance of at least 20 cm of the transmitter from body.

The product ***RI7G83*** uses an integrated antenna. Antenna gain can be calculated as the difference of the measured EIRP and measured RF power at the RF port. Antenna gain. Measured EIRP are recorded in page 11 of the test report 2_3745-01-01/04 while measured RF power at the RF port can be found in page 8. The difference is always lower than –0.7 dB, so we can conclude that the antenna gain is lower than 0.7 dBi or 0.85

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/1500	30
1500 – 100.000	1.0	30

The equipment ***RI7G83*** transmits in the 1850.2 – 1902.8 MHz frequency range, so the applicable MPE limit is 1 mW/cm^2.

Under the conditions stated above MPE limits can be guaranteed as the calculation below shows:

MPE calculation for the lowest channel (CH 512: 1850.2 MHz):

Average power measured in GSM mode at the RF port = 28.2 dBm = 660.69 mW

The average power in GPRS mode is twice the one in GSM mode so:

Average power measured in GPRS mode at the RF port = 31.2 dBm = 1321.39 mW

Using Equation from page 18 of OET Bulletin 65, Edition 97-01:

$S = P \cdot G / 4\pi R^2$

Where,

S = power density in mW/cm^2 (1 mW/cm)
P = power input to the antenna
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 in cm (20 cm Prediction distance)

We obtain the following results:

Average power in GPRS mode (at RF port) (dBm)	Antenna Gain (dBi)	Average power in GPRS mode (radiated) (dBm)	Average power in GPRS mode (radiated) (mW)	R - Prediction distance (cm)	S - Power density (mW/cm^2)
31.2	- 0.7	30.5	1122.02	20	0.22

This prediction demonstrates that the power density levels at a distance of 20 cm are below the maximum levels allowed by the FCC rules when the equipment transmits in the lower channel.

MPE calculation for the middle channel (CH 661: 1879.8 MHz):

Average power measured in GSM mode at the RF port = 28.5 dBm = 707.94 mW

The average power in GPRS mode is twice the one in GSM mode so:

Average power measured in GPRS mode at the RF port = 31.5 dBm = 1415.89 mW

Using Equation from page 18 of OET Bulletin 65, Edition 97-01:

$S = P \cdot G / 4\pi R^2$

Where,

S = power density in mW/cm^2 (1 mW/cm)
P = power input to the antenna
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 in cm (20 cm Prediction distance)

We obtain the following results:

Average power in GPRS mode (at RF port) (dBm)	Antenna Gain (dBi)	Average power in GPRS mode (radiated) (dBm)	Average power in GPRS mode (radiated) (mW)	R - Prediction distance (cm)	S - Power density (mW/cm^2)
31.5	- 0.7	30.8	1202.26	20	0.24

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This prediction demonstrates that the power density levels at a distance of 20 cm are below the maximum levels allowed by the FCC rules when the equipment transmits in the middle channel.

MPE calculation for the highest channel (CH 810: 1909.2 MHz):

Average power measured in GSM mode at the RF port = 28.4 dBm = 691.83 mW

The average power in GPRS mode is twice the one in GSM mode so:

Average power measured in GPRS mode at the RF port = 31.4 dBm = 1383.66 mW

Using Equation from page 18 of OET Bulletin 65, Edition 97-01:

$S = P \cdot G/4\pi R^2$

Where,

S = power density in mW/cm^2 (1 mW/cm)
P = power input to the antenna
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 in cm (20 cm Prediction distance)

We obtain the following results:

Average power in GPRS mode (at RF port) (dBm)	Antenna Gain (dBi)	Average power in GPRS mode (radiated) (dBm)	Average power in GPRS mode (radiated) (mW)	R - Prediction distance (cm)	S - Power density (mW/cm^2)
31.4	- 0.7	30.7	1174.90	20	0.23

This prediction demonstrates that the power density levels at a distance of 20 cm are below the maximum levels allowed by the FCC rules when the equipment transmits in the highest channel.

Conclusion:

The equipment ***RI7G83*** complies with the MPE uncontrolled exposure limit..

Sincerely,

P.A.

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