attn: Reviewing Engineer
Federal Communications Commission
7435 Oakland Mills Road
Columbia, MD 21046

July 22, 2004

RE: RF exposure information FCC ID: QOQWRAP229X

FCC ID Number Product	Title/Model
QOQWRAP229X	Bluetooth Access Server/ WRAP Multiradio Access Server

TO WHOM IT MAY CONCERN

The product ***WRAP Multiradio Access Server*** is designed to be used as an access point. This transmitter must be installed to provide a separation distance of at least 20 cm from everybody.

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)**
300 – 1500	f/1500
1500 – 100.000	1.0

The equipment ***WRAP Multiradio Access Server*** transmits in the 2400 - 2483.5 MHz frequency range, so the applicable MPE limit is 1 mW/cm^2. The equipment can be provided with up to 4 Bluetooth modules WRAP THOR 2022-1-B2B (FCC ID: QOQWRAP2022-1-B2B):

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

When provided with one Bluetooth module WRAP THOR 2022-1-B2B (FCC ID: QOQWRAP2022-1-B2B):

Measured maximum peak output power (e.i.r.p.) = 12.55 dBm at 2441 MHz = 17.99 mW e.i.r.p.

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

$S = P \cdot G/4\pi R^2 = Prad\ (e.i.r.p.)/4\pi R^2$

Where,

S = power density in mW/cm^2 (1 mW/cm^2 used for G)
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:

Maximum EIRP (dB)	Maximum E.I.R.P. (mW)	R - Prediction distance (cm)	S – Power density (mW/cm^2)
12.55	17.99	20	0.003579

The equipment can be provided with up to 4 Bluetooth modules and additionally the equipment has a Compact Flash slot, where an additional transmitter (WLAN, GPRS, etc.) can be installed.

In this case, the total power density at a distance of 20 cm from the device is the sum of the power density from each transmitter:

$S_{Total} = 4 \times S_{module} + S_{Compact\ Flash\ card} = 4 \times 0.003579\ mW/cm2 + S_{Compact\ Flash\ card} < 1\ mW$

$S_{Total} = 4 \times 0.003579\ mW/cm2 + S_{Compact\ Flash\ card}$

$S_{Total} = 0.014316\ mW/cm2 + S_{Compact\ Flash\ card}$

Reminding that MPE limit is 1 mW:

$S_{Total} < 1\ mW/cm2$

$0.014316\ mW/cm2 + S_{Compact\ Flash\ card} < 1\ mW/cm2$

$S_{Compact\ Flash\ card} < 1\ mW/cm2 - 0.014316\ mW/cm2 = 0.977416\ mW/cm2$

$S_{Compact\ Flash\ card} < 0.977416\ mW/cm2$

$Prad\ (e.i.r.p.)_{Compact\ Flash\ card} / 4pR^2 < 0.977416\ mW$

Where R = 20 cm

We obtain the following result:

$Prad\ (e.i.r.p.)_{Compact\ Flash\ card} < 4954.588246\ mW = 36.95\ dBm$

In the following paragraphs we will present some examples to demonstrate the compliance of the device in different situations:

Example 1: 15.247 or 15.407 Compact Flash Card with maximum allowed e.i.r.p. of 4 W

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

$S_{Compact\ Flash\ card} = Prad\ (e.i.r.p.)_{Compact\ Flash\ card} / 4pR^2 = 4000\ mW/4p\ (20\ cm)^2$

$S_{Compact\ Flash\ card} = 0.795774\ mW/cm2$

$S_{Total} = 4 \times S_{module} + S_{Compact\ Flash\ card} = 4 \times 0.003579\ mW/cm2 + 0.795774\ mW/cm2 =$

$S_{Total} = 0.014316\ mW/cm2 + 0.795774\ mW/cm2 = 0.795774\ mW/cm2 < 1\ mW/cm2$

Example 2: Part 22 Compact Flash Card with maximum e.r.p. of 1.5 W (Category excluded of MPE evaluation according to §2.1091)

Using Equation from page 18 of OET Bulletin 65, Edition 97-01 and considering that e.i.r.p. = 1.64 x e.r.p.:

$S_{\text{Compact Flash card}} = \text{Prad (e.i.r.p.)}_{\text{Compact Flash card}} / 4\pi R^2 = 1500 \cdot 1.64 \text{ mW}/4\pi (20 \text{ cm})^2$

$S_{\text{Compact Flash card}} = 0.489401 \text{ mW/cm2}$

$S_{\text{Total}} = 4 \times S_{\text{module}} + S_{\text{Compact Flash card}} = 4 \times 0.003579 \text{ mW/cm2} + 0.489401 \text{ mW/cm2} =$

$S_{\text{Total}} = 0.014316 \text{ mW/cm2} + 0.489401 \text{ mW/cm2} = 0.503717 \text{ mW/cm2} < 1 \text{ mW/cm2}$

Example 3: Part 24 Compact Flash Card with maximum e.r.p. of 3 W (Category excluded of MPE evaluation according to §2.1091)

Using Equation from page 18 of OET Bulletin 65, Edition 97-01 and considering that e.i.r.p. = 1.64 x e.r.p.:

$S_{\text{Compact Flash card}} = \text{Prad (e.i.r.p.)}_{\text{Compact Flash card}} / 4\pi R^2 = 3000 \cdot 1.64 \text{ mW}/4\pi (20 \text{ cm})^2$

$S_{\text{Compact Flash card}} = 0.978803 \text{ mW/cm2}$

$S_{\text{Total}} = 4 \times S_{\text{module}} + S_{\text{Compact Flash card}} = 4 \times 0.003579 \text{ mW/cm2} + 0.978803 \text{ mW/cm2} =$

$S_{\text{Total}} = 0.014316 \text{ mW/cm2} + 0.978803 \text{ mW/cm2} = 0.993119 \text{ mW/cm2} < 1 \text{ mW/cm2}$

This prediction demonstrates that:

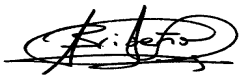
The power density levels at a distance of 20 cm are below the maximum levels allowed by the FCC rules providing that the transmitter installed in the CF slot will have a radiated transmitting power of 36.95 dBm.

Conclusion:

The equipment ***WRAP Multiradio Access Server*** complies with the MPE, if it is installed to provide a separation distance of at least 20 cm from everybody.

Sincerely,

P.A.



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