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To: Stan Lyles
 FCC Application Processing Branch

Re: FCC ID SNY-GP850A
Applicant: Pacifica International
Correspondence Reference Number: 28328
731 Confirmation Number: EA529430

This is in response to your questions in correspondence reference # 28328 on 1/12/05.

1) Please submit out power measurements for Part 22 ERP and Part 24 EIRP.

The recommended 3 dBi antenna is configured and specified as follows:

800 MHz Cellular band:

The antenna gain = 3 dBi, 0.77 dBd
The GP850A output power measurement at 836 MHz = 34.6 dBm
Effective radiated power (**ERP**) at antenna = 35.37 dBd (3.44W)
Effective isotropic radiated power (**EIRP**) at antenna = 37.51 (5.64W)

1900 MHz PCS band:

The antenna gain = 3 dBi, 0.77 dBd
The GP850A output power measurement at 1850 MHz = 33.3 dBm
Effective radiated power (**ERP**) at antenna = 34.07 dBd (2.55W)
Effective isotropic radiated power (**EIRP**) at antenna = 36.21 (4.18W)

2) Form731 has 3W for 800MHz-band - MPE evaluation must account for maximum output power listed on Form731 - please revise.

RF power and Human Exposure Analysis as per 47CFR§1.1310 (revised 1/17/05) guidelines:

For transmitters operating in the 824-849 MHz range, paragraph 1.1310 Table 1 limits maximum permissible exposure (MPE) to $f/1500 \text{ mW/cm}^2$ for uncontrolled environments and $f/300 \text{ mW/cm}^2$ for controlled environments.

Therefore for the 824-894 MHz:

The MPE of the uncontrolled environment = $849/1500 = 0.566 \text{ mW/cm}^2$

The MPE of the controlled environment = $849/300 = 2.83 \text{ mW/cm}^2$.

For transmitters operating in the 1850-1910 MHz range, paragraph 1.1310 Table 1 limits maximum permissible exposure (MPE) to 1 mW/cm^2 for uncontrolled environments and 5 mW/cm^2 for controlled environments.

We will use the uncontrolled environment specification as the worst case specification.

The far field on-axis power flux density (W/m^2) is calculated using the following formula:

$$S = G P_T / 4\pi R^2$$

Where:

S = Power density (mW/cm^2)

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

P_T = Power input to the antenna (Watts)

R = Distance to the center of radiation of the antenna (cm)

RF power and Human Exposure Calculations of the GP850A booster

The following are the calculations of RF power radiated from the 3W booster model GP850A with the 3 dBi antenna. Users may have some concern with the 3W booster in the 800 MHz cellular band and the 1900 MHz PCS band.

Using the far field power flux density calculation:

$$S = G \times P_t / (4\pi R^2)$$

Where:

S = power density (W/cm^2) at 50 cm

G = Antenna gain = 3 dBi or $10^{3/10} = 1.995$

P_t = Maximum output power from the booster in Watts

For 800 MHz cellular band, $P_t = 34.77 \text{ dBm}$ or 3W

For 1900 MHz PCS band, $P_t = 33.3 \text{ dBm}$ or 2.133W

R = 50 cm or the distance from the antenna to human. The antenna is externally mounted on the car roof.

Calculations for 800 MHz Cellular

$$\text{Power density (W/cm}^2\text{)} = (1.995 \times 3) / (4 \times 3.14 \times 50 \times 50) = \mathbf{0.19W/cm}^2$$

Calculations for 1900 MHz PCS

$$\text{Power density (W/cm}^2\text{)} = (1.995 \times 2.133) / (4 \times 3.14 \times 50 \times 50) = \mathbf{0.136W/cm}^2$$

Human Exposure Calculations

Description	800 MHz Cellular band	1900 MHz PCS band
Maximum output power of the amplifier in dBm (in Watts)	34.77 dBm (3W)	33.3 dBm (2.133W)
Antenna Gain in dBi (linear gain)	3 dBi (1.995)	3 dBi (1.995)
Operational Frequency	824-849 MHz	1850-1910MHz
Minimum distance (Controlled): From radiating source for personnel aware of radio frequency equipment and who are able to limit their exposure time. (Installation Technicians)	50 cm	50 cm
Minimum distance (Uncontrolled): From radiating source for personnel unaware of radio frequency equipment and who are not able to limit their exposure time. (General Public)	50 cm	50 cm
Calculated Maximum RF Power Density from GA850A:	0.19 mW/cm ²	0.136 mW/cm ²
Maximum Permissible Exposure (MPE) in the uncontrolled environment 6 min average exposure:	0.556 mW/cm ²	1 mW/cm ²
Complies with MPE Limits:	Yes	Yes

The following instructions will be placed in the User/Installation Manual instructing installers and users to maintain the minimum MPE distances during operation of the EUT:

"NOTICE: During transmitter operation, a minimum distance of 50cm shall be maintained between the antenna and personnel, in order to meet the maximum permissible exposure (MPE) limits in section 1.1310 of FCC Rules."

3) Per 47 CFR 2.1091(d)(2) 30 min. time-averaging is not applicable for devices such as this operating in uncontrolled exposure conditions. Please revise MPE evaluation accordingly.

The 30 min. time averaging was removed from the MPE table. Please see the table above.

4) As FCC ID records show for similar devices, in accordance with 47 CFR 1.1307, 2.1091, and OET 65 Suppl. C, Part 22/24 800/1900MHz devices with ERP greater than 1.5W@f<1.5GHz or 3W@f>1.5GHz are requested to perform RF exposure routine evaluation MPE testing or computer modeling. MPE estimation, e.g., per OET 65 eqn 3 is requested for devices operating in mobile RF exposure conditions and for rule parts listed in 2.1091(c) with power less than the categorical exclusion levels listed in that rule section. In this filing EMC report pp 36-39 contains 800MHz-band MPE estimation info for 3dBi antenna gain and 2.858W. This gives 3.48W ERP making device subject to MPE test or computer modeling, as described above. Note that this ERP level may change if amplifier will always be used with connecting cables having some amount of attenuation, in which case filing and device user instructions should include applicable cable and antenna details and specifications. Please revise MPE evaluation accordingly

The table above revises the information contained on pages 36-39 of the report by using 3W for the 800 MHz band. We also add the recommended antennas to the user manual on page 3. Any additional cable will only attenuate the signal, therefore, the ERP will be less than the number on this report. The report had **considered the worst maximum MPE of these products**. We designed these products to comply with the FCC requirements.

See attached revised user manual.

Please let me know if you need any additional information. Your consideration in this matter is appreciated.

Sincerely yours,



Udom Vanich
Engineering Manager
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