8 December 2003

To: Federal Communications Commission
Washington, DC

From: David Waitt, Sr. Regulatory Engineer
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Subject: Comments Regarding Proposed Changes To The Commission's Rules Regarding RF Exposure To RF Electromagnetic Fields
ET Docket No. 03-137

Ladies and Gentlemen,

First and foremost I would like to commend the Commission for taking steps to simplify and clarify the SAR measurement policies.

The palmOne product line currently incorporates Part 15 portable wireless devices (Tungsten C) as well as Part 22 / Part 24 cellular phones (Treo 600 CDMA and GSM phones).

Personally, over the last ten years, I have been intimately involved in the EMC and RF testing and certification of several Part 15, Part 22, Part 24 and Part 27 products.

PalmOne (formally Palm Inc.) is very interested in working with the Commission in any capacity to help clarify the SAR testing guidelines. While agreeing with the Commission on the need to establish thresholds, below which, no additional SAR testing is required, these comments also highlight the need for a small increase in measured SAR and/or transmit power to be allowed with a Class I Permissive Change.

PalmOne appreciates the opportunity to offer the following comments.

Subpart C: RF Evaluation Requirements for Transmitter Modules

Paragraph 21
The Commission proposes "to authorize any Section 15.247 unlicensed device as a 'transmitter module' providing that the operating configurations and exposure conditions are identified and the maximum peak conducted power is less than 100 mW."

PalmOne appreciates the Commission's attempts to characterize a module's prospective hosts are appreciated; this places the Commission in the position of continuously having to evaluate prospective hosts. It is always difficult to envision the future uses of a flexible device such as a 15.247 module and while every effort may be made to characterize and describe acceptable host configurations, there will always be some configurations that were not envisioned.

The prospective host configuration may be similar to an "approved" host, but be different enough (due to integral host shielding for example) to raise exposure concerns. In order to keep the Commission out of the business of having to repeatedly make judgment calls regarding the similarity, or lack thereof, between an approved host and a prospective host, I agree with the Commission's proposal that if a SAR evaluation shows no increase in measured SAR levels, integration of the module could be handled as a Class I Permissive Change, regardless of host changes.

Additionally, the Commission should allow for some increase in SAR to be covered with a Class I Permissive Change. I have queried a few leading SAR labs and have been told that the level of SAR repeatability is approximately 2%. My previous testing experience on various products supports this 2% repeatability level. If the repeatability of a SAR measurement is considered to be 2%, then exceeding the previous initial SAR measurement by that amount should be allowed with a Class I Permissive Change.

For example, if SAR was originally measured at the low middle and high channel of the band, and in a new, proposed host, SAR measures higher by 2 percent, this should still be allowable as a Class I Permissive Change. Whatever the Commission determines is the correct level of repeatability, it is proposed that an increase of that same percentage be allowed with a Class I Permissive Change, since the actual SAR change cannot be accurately determined below the level of repeatability. Only if SAR has increased beyond the established positive tolerance should a Class II Permissive Change be required.

At the end of paragraph 21 the Commission seeks comment on exactly what information should be included in the installation instructions provided with the transmitter module. As a minimum, I feel that following should be provided.

- Minimum required separation distance, antenna to user
- Minimum required separation distance, module to user
- A brief description of the shielding between the user and the module
- A brief description of the shielding between the user and the antenna
- A description of the host housing material.

A detailed description of the above parameters would allow prospective module users to determine if their host is similar in design to the one originally specified or tested by the module manufacturer.

In an effort to maximize the flexibility of a certified module, the Commission proposes three categories of Host Independent Transmitter modules

- *Radiotelephones*
- *Laptop (Notebook) Computers*
- *PDAs*

Paragraph 23, Radiotelephones
The Commission proposes to allow a module with a peak radiated or conducted power of less than 2 mW to be added to a phone without the need for additional SAR testing.

Instead of specifying a fixed power threshold, the limit should be tied to the repeatability of the SAR test. As discussed above, 2% is a typical repeatability percentage. It seems overly burdensome to require manufacturers to repeat SAR testing for a very small percentage increase in RF power, especially if:

- There was sufficient margin demonstrated during the initial SAR tests.
- The percentage power increase is less than the level of repeatability of the SAR test (2%)

PalmOne proposes a total RF module power increase limit of 2% of the lowest transmit power that was tested during the initial SAR certification be allowable as a Class I Permissive Change.

<u>Examples</u>

- Single band CDMA phone with a maximum transmit power of 250 mW. Max allowable RF power increase due to module: 250 * .02 = 5 mW.

- Dual band GSM (850 MHz and 1900MHz): 850 GSM has a transmit power of 2 W, but the 1900 MHz band has a max transmit power of 1 W, so the lower power dominant transmitter sets the upper limit of the module power. 1000mW * .02 = 20 mW

- A device with multiple transmitters such as dual band GSM phone (850 MHz and 1900MHz) with a built in IEEE802.11 transmitter with a power of 20 mW. Since it is possible for the 802.11 and the GSM phone to transmit at the same time, and SAR would have to had been tested in this manner initially, (1000 + 20) * .02 = 20.4mW

Another acceptability criteria to adding a "2% module" is that the initial SAR test result must have shown some margin to the maximum allowable SAR. PalmOne suggests that a minimum of 5% margin on the initial SAR test be necessary to allow the addition of a "2% module". The 5% simply gives a little margin when incorporating a "2% module".

Furthermore, regulating the addition of after market RF modules into a device such as a cell phone has long been a concern of the FCC. Adoption of a "2%" limit would encompass several of the aftermarket modules (Bluetooth and 802.11) available. This would then allow users to incorporate modules into their devices while remaining compliant with the FCC guidelines.

Paragraphs 25 and 26 Laptop Computers
Paragraph 25 refers to the distance between the "transmitting elements" and the body. Paragraph 26 refers to the location of the modular RF transmitter (e.g. keyboard). In all cases the location of the transmitting antenna, rather then the module, should be of paramount concern due to the fact that the majority of the RF energy, obviously, is emitted from the antenna and not the module.

Paragraphs 29 & 30
The Commission proposes different threshold limits depending on the use of the PDA. Paragraph 29 references a PDA used exclusively as a hand-held device while paragraph 30 addresses a PDA that can be used while worn/placed on the body.

In the past it has proven difficult to determine when a PDA type of device would be used exclusively as a handheld device or as a handheld and body worn device.

PalmOne suggests the following comments / observations that may help to determine the intended usage of a product.

There are several factors that determine if a device would typically be used while worn on the body, or while placed on the lap. In paragraph 29, the Commission requested comment on determining the typical usage of a product based on its functionality. Typical usage of the product cannot be determined solely based on its functionality. For example, one might be inclined to say, "If the device can send email then it may be used on the lap" however this would not describe typical usage because several small cellular phones incorporate email and Internet browsing capability. Few would argue that these small cellular phones would typically be used on a persons lap. As small portable devices incorporate more and more functionality, determining usage based on this functionality will become increasingly difficult.

Paragraph 30 PDAs
The Commission proposes a 2 mW threshold for the additional of a transmitter to a PDA device. As with the addition of a transmitter module to a cell phone, the allowable module power should be based on the power of the dominant transmitter and the repeatability of the SAR test.

In the case of a PDA, there are three scenarios to be considered.

- A PDA that previously did not incorporate an intentional transmitter.
- A PDA that incorporates an intentional radiator, and has been evaluated for SAR.
- A PDA that incorporates an intentional radiator, and has NOT been evaluated for SAR.

A PDA that previously did not incorporate an intentional transmitter.
There are several PDAs available to do not incorporate an intentional transmitter. In these cases, SAR would not have been evaluated previously; since there is no previous data on which to base an allowable threshold, I agree with the 2 mW limit proposed by the FCC.

A PDA that incorporates an intentional radiator, and has been evaluated for SAR.
In the case where a PDA incorporates an intentional transmitter (such as 802.11 B) and SAR testing was performed initially, I propose a similar "2% limit" similar to cellular phones. This would allow manufacturers to add a low power Bluetooth module to the device. In the case of a 100mW, 802.11 transmitter within the PDA, this would allow the addition of a 2 mW Bluetooth module.

A PDA that incorporates an intentional radiator, and has NOT been evaluated for SAR.
Similar to above, since there is no previous SAR data on the device, palmOne recommends adhering to the 2mW limit.

To determine the typical usage of the device, the physical properties of the device as well as the methods of user input/output (I/O) must be considered. The consideration should include (but not be limited to):

Size of the display:

While the size of the overall device plays a part determining typical usage, more important is the size of the display. If the display is not easily read from a distance of approximately 2 feet, it is unlikely that it would be used while placed on the lap or thigh on a regular basis.

Shape of the device / Primary User I/O.

If the device has a rounded rear form factor, it may not lend itself to be being balanced on the lap while being used. If one hand were used to stabilize the device, it would most likely be necessary to for the device rely on a touch screen and a stylus for most / all of the user input.

Several new PDA type devices incorporate small "thumb" keyboards. These devices do not lend themselves to being stabilized on the lap with one hand while the user enters text with the index finger of the other hand. Rather, the devices are designed to be held in two hands and the thumbs used to type on the keyboard and enter text.

If the device has a broader, flat back such that it can be balanced on the lap (or thigh) without using one hand to stabilize the device, then the device would still have to rely primarily on user input via a touch screen and stylus. Utilizing the small "thumb keyboards" with index fingers is awkward at best.

Obviously there are additional criteria to be examined; weight of the device, resolution of the display, brightness of the display, additional I/O methods (beyond the keyboard and the touch screen) all should be considered when making such a determination.

A detailed exploration of these factors may be beyond the scope of these comments. The omission of comments in this forum should not be interpreted as trivializing the importance of accurately categorizing the typical usage of a device. The Commission is well aware that burdening a device with SAR requirements for usage positions for which the device was not intended can lead to excessive test costs for manufacturers.

With respect to the Commission's request for comments on acceptable thresholds for devices intended for use while worn on the body, palmOne suggests a similar 2% threshold to that described earlier. If the additional RF power, due to the addition of a module, is less than 2% of the RF power of the dominant transmitter initially tested, it is below the repeatability of a typical SAR test and is not accurately quantifiable. It should therefore be handled as a Class I Permissive Change

Subpart G

Paragraph 42 Labeling requirements

The Commission requests comments on the practicality of requiring labels advising users of RF exposure information and whether the labeling requirements should be expanded to include cellular phones. There are already some international regulatory bodies that require RF exposure information be included in a prominent location within the user manual for the product. I believe this is a reasonable approach. Requiring RF exposure information on the product label, especially for a quad band device that is used held to head and worn on the body is impractical. To completely convey the RF exposure information for such a device would require eight SAR numbers at a minimum. (4 bands, head and body). Placing only one SAR number on the label does not convey all the relevant RF exposure information. The user manual is the proper place for this information. Additionally, a label that would contain all this information reduces the aesthetics of a small handheld device such as a cellular phone or PDA.

Respectfully submitted,

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