Network Systems Organization

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Federal Communications Commission
Equipment Approval Services
P.O. Box 358315
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Re: FCC ID H9PLA3021-500 Ref # 9798

Date: November 24, 1999

Dear Reviewer,

In response to the following Email:

On Fri, 24 Sep 1999 10:10:02 -0400, oetech@fccsun07w.fcc.gov (OET) wrote:

To: Norman Nelson, Symbol Technologies, Inc.
From: Joe Dichoso
jdichoso@fcc.gov
FCC Application Processing Branch

Re: FCC ID H9PLA3021-500
Applicant: Symbol Technologies Inc
Correspondence Reference Number: 9798
731 Confirmation Number: EA94853
Date of Original E-Mail: 09/24/1999

Please address the following RF safety issues. When downloading information with respect to this e-mail, submit any exhibits in the RF exposure folder. Contact Kwok Chan at KChan@fcc.gov if you have any questions.

This is a 250 mW DSS PC card from Symbol Technology, EA 94853 -

1. The 731 form (or EAS) is indicating 250 mW . Measured output in section 4.1 of EMC report has 24.5-25.2 dBm (281-331 mW). This same section also describes EUT tested at 20.3 dBm (107 mW). The users manual is describing this transmitter as a 100 or 500 mW transmitter. The appropriate output for this transmitter needs clarification. The output power determined here may affect how other items (in the following) should be addressed.

The output power for the EAS should be 330 mW. The 20.3 dBm is a misprint that was carried over from the test report of the 100 mW version of this transmitter. The correct power in the test report is 24.9 dBm. The power level of the middle channel.

2. The manual describes a PC Cards and an ISA cards for this transmitter, typically for laptop and regular PC computer configurations. The MPE info describes a number of handheld products from Symbol Technology and third parties. Do handheld products use the PC Card or ISA card, or if there is a modular version of this transmitter for OEM integration into handheld and other products?

All hand held products for Symbol and third parties use the PC Card version of the transmitter. The ISA card is used in desktop and tower style PC systems and uses mobile antennas. The PC Card is inserted into a PCMCIA socket of the ISA card.

Note: most of the following items have been explained to the applicant in similar filing (EA 91115) approved previously for 250 mW. Currently there is a pending Class II Change filing (EA 94292) which has similar output discrepancy problems (250 mW vs 500 mW). There is also a 100 mW version of this transmitter filed under EA 94885, pending, that has the same RF exposure issues as this one.

3. The MPE info included in the filing describes a total of 21 antennas, among them, 8 are typically mounted at remote locations. These remote antennas can generally satisfy MPE requirements by providing users and installers with appropriate installation and operating instructions - with respect to 2.1091 of FCC rules, a minimum of 20 cm is needed. Please clarify by what means will the responsible parties be informed regarding installation and operating requirements for satisfying MPE limits for these 8 remote antennas.

For all mobile transmitters that are greater than 100 mW Symbol includes the following safety statement that is published in the installation instructions for the device.

***Symbol Safety Statement*: "The maximum permissible exposure (MPE) limit for these antennas when used with a Spectrum24 device is 6.5 inches (16 cm). The MPE limit is calculated to reflect the distance a person should maintain from the antenna. The MPE distance does not apply to transient exposure due to incidental passage closer than the MPE limit."**

4. For the other 13 antennas, 7 are intended for incorporating into handheld products (6 Symbol Technology products and 1 third party), 1 for a body-worn product from Symbol and the other 5 are typically for standalone use with laptop and regular computers. These 13 antenna and product configurations are required to satisfy SAR requirements for portable transmitters since they operate within 20 cm of persons. Spread Spectrum transmitters (DSS) are generally categorically excluded from routine RF exposure evaluation for demonstrating compliance, however, 15.247(b)(4) specifically require DSS to operate in a manner that ensures the public is not exposed to RF levels exceeding FCC requirements. In order to determine SAR compliance with respect to 15.247(b)(4), information relating to the construction, packaging, antenna location, operating conditions and configurations of each individual handheld product and standalone antenna are needed to estimate an individual product configuration's potential for exceed ing SAR limit and to determine if separate SAR evaluation must be requested to demonstrate or determine compliance. Please clarify accordingly for these 13 antennas so that we can determine compliance based on the exposure conditions established by the individual device or product and its output power level. Note: For portable transmitters, RF exposure is highly dependently on near-field coupling conditions; therefore, product packaging and operating configurations are important factors. In certain situations,

identical antennas or ones with substantially lower gain could produce higher SAR due to poor antenna matching, high case/ground currents or enhanced RF coupling in specific product configurations. For these reasons, we cannot extend the SAR results for the WWC-1040 to other handheld products. It is acceptable to use SAR results for the WWC-1049 to support the WWC-1040 since the only difference is in memory configurations, provided the SAR results are not very close to the limit.

Symbol uploaded a revised test report addendum that includes specifics of antenna location, use, product packaging, and operating configurations.

5. Based on the operating conditions and configurations of the individual handheld products, it may be necessary to include certain operating instructions for these products to satisfy SAR requirements, as required by 15.247(b)(4); even though, SAR evaluations may not be necessary to demonstrate compliance if the output power is low. The existing operator's manual for this transmitter does not have any operating information relating to the handheld products or other antennas (remote-mount or standalone) for purpose of ensuring RF exposure compliance, please clarify.

The operators manual for the PC Card is included with the card when provided as a stand alone module for use in a laptop or loaded into an ISA card for a regular PC. When the PC Card is integrated into another device that device's operators manual contains specific instructions on use and RF safety that are appropriate for that specific device.

6. There are a number of antennas that included certain cable lengths in the MPE estimations. Please clarify if the cable lengths (ranging from 6' to 50') are designed to be part of these antennas and transmitter systems. Please provide a tabulated list showing the actual antenna gain, the nominal cable loss (such as dB/100 ft at 2.4 GHz) for the type of cable used, minimum cable length and compliance mechanisms (such as installation instructions, operating instructions, conditions satisfied by design criteria, supporting test data etc.) for the antennas included in this filing.

The cables are integrated with their antennas. They are permanently joined without connectors at the antenna cable junction and all antenna gains include the cable loss.

Kwok Chan

Respectfully,

Norman H. Nelson