

DECLARATION OF Richard R. Lee

1 I, Richard R. Lee, declare as follows:

2 1. I make this declaration of my own personal knowledge and if called as a witness,  
3 I would competently testify to the facts set forth herein.

4 2. I received my Doctorate in Physics from Brandeis University in 1986, and have  
5 been employed since in the development of embedded computer systems. I was first employed  
6 in the development of computer systems based on Microsoft Corporation's Windows CE  
7 product in 1997, and have continued through the present time in this activity. I have been  
8 recognized by Microsoft, as an Embedded Windows MVP for my work with the Windows CE  
9 product. I am deeply familiar with the internal workings of this operating system, have spoken  
10 at conferences and written articles, and taught classes related Windows CE internals and  
11 deployment.

12 3. Computer based systems are generally described in terms of the hardware –  
13 processor, memory, and other physical devices making up the “platform”, application software  
14 which control specific behavior of the system including user interaction, and operating system  
15 software which controls the operation of the hardware and the loading and execution of the  
16 application software. The lowest level of the operating system software is it's “kernel”, a  
17 program which provides common services to all other software on the system. These services  
18 include, but are not limited to: memory and other resource allocation, task scheduling,  
19 communication between programs, and access to system hardware.

20 4. Unlike other Microsoft operating system products such as MS-DOS,  
21 Windows NT, or Windows XP, the Windows CE kernel must be tailored for each “target  
22 system design”. In this context, a target system design is the unique combination of hardware or  
23 “platform” and a set of operating system support features specifically selected to meet the  
24 system requirements. The principal executable module for the kernel, NK.EXE, is custom built  
25 for the target design from precompiled binary library files provided by Microsoft, and from  
26 platform specific source code compiled and linked to the Microsoft binaries. It is not possible to  
27 build a functioning release of Windows CE for any platform strictly from the executable

1 components provided by Microsoft. There are always program elements which must be  
2 developed for that specific platform, which must be compiled and statically linked to NK.EXE.  
3 Development of these target specific program elements and the linking to Microsoft libraries to  
4 build NK.EXE is typically done by the Original Equipment Manufacturer (OEM) or by their  
5 agent; not by Microsoft. These elements, along with platform specific device driver software,  
6 are referred to as the “OEM Adaptation Layer” or “OAL” in the Windows CE product  
7 documentation, reflecting this acknowledged division of responsibility between the common  
8 elements of the operating system provided by Microsoft, and the target specific elements  
9 provided by the manufacturer. An essential quality of the static linking process is that it  
10 incorporates program elements from the linked object files and libraries into a single file. The  
11 Windows CE kernel module, NK.EXE, contains program elements from the off-the-shelf  
12 Microsoft libraries, and from customized code developed by the device manufacturer. NK.EXE  
13 may therefore be unique to the particular target system design for which it was built.

14           5 . In addition to the precompiled binary library files, Microsoft also distributes  
15 source code for many of the program elements comprising the Windows CE product. This  
16 source code is provided for both fault analysis use (“debugging”), and with certain limitations,  
17 the creation of derivative works by the system developer. Such derivatives may be created to  
18 correct flaws in the original code provided by Microsoft, or to substantially change the behavior  
19 of the system. The modified source code might then be compiled and linked with other object  
20 libraries to create the collection of executable program modules, including NK.EXE, which  
21 make up the Windows CE operating system for distribution on a particular target system design.

22           6 . The behavior of an application may be altered by changes in the underlying  
23 operating system. Any change to the underlying hardware of the target system design may  
24 require rebuilding of key Windows CE system software elements, including the kernel file  
25 NK.EXE. In particular, analysis of the source code of an application designed to run on a  
26 particular target system would not be sufficient to determine that any changes to the operating  
27 system components do not affect system behavior.

